


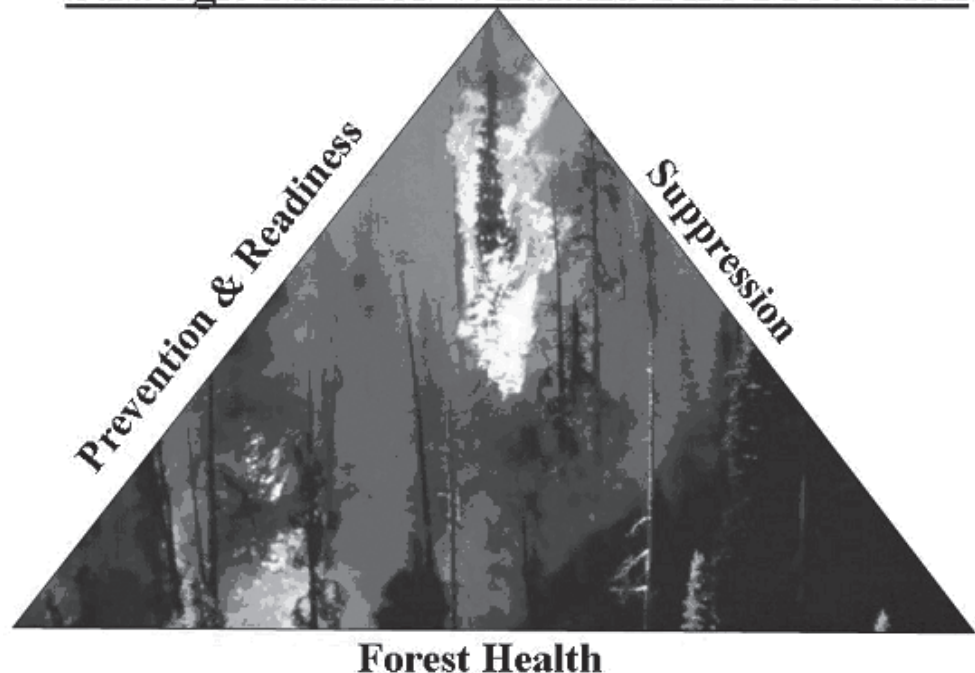
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# **Appendix A**

## **A Primer Relating to Forests, Forest Health, and Wildland Fire Protection on Lands Protected by the State of Washington**

### **Strategic Plan for Wildland Fire Protection**







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# Introduction

Wildfire historically has and always will significantly impact the quality of life in Washington State. This is the Evergreen State — forests are a signature resource. About 21.8 million acres in Washington are forested (51 percent of the state's total 42.6 million acres). And fire is a major element in Washington's forests.

The direct and indirect consequences of wildfire on the state's citizens, economy and ecology are real but not constant. Understandably, this results in heightened public policy concerns regarding wildland fire protection and how, when and where wildfires are fought... and who does the important and potentially dangerous work.

In part, the public policy concerns are created by the interaction of the following inter-related factors:

- Public safety;
- Overlapping protection jurisdictions and interagency relationships;
- Population increases and changing demographics;
- Proliferation of homes in the forests and in the wildland urban interface;
- Changes in climate and weather patterns;
- Drought;
- Increased fuel loading;
- Changes in forest ownership patterns and management objectives;
- Costs of firefighting;
- Firefighter safety;
- Critical training, recruitment and retention of specialized skills;
- Smoke management and air quality implications to public health;
- Forest health shifts resulting in forests that are generally less resistant to uncharacteristic, economically or environmentally undesirable wildfire, windstorm, pests, disease and other damaging agents; and
- Forests less able to recover following biological or environmental disturbances.

There are significant questions about the appropriate funding levels and funding mechanisms and the appropriate mix of fire prevention, pre-suppression and suppression activities. It is timely to look at the current legal structure and partnerships. The roles and expectations of Washington's wildfire partners need clarity. At a very foundational level, how do forest health issues affect the effectiveness and efficiency of Washington's wildfire public policy?

Collectively, the factors need to be carefully evaluated to understand how wildfire protection might be done differently both today and tomorrow. There is a need to comprehensively evaluate the policy and strategic direction of wildland fire protection on state-protected forestlands.

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## The Plan

As the state agency charged with protecting more than 12 million acres of private and state forestlands from wildfire, the Department of Natural Resources (DNR) plans to develop a *"2020 Strategic Plan for Wildland Fire Protection on Lands Protected by the State of Washington."*

The Plan will take the form of a report to the Commissioner of Public Lands. The Plan will explore issues related to the above factors and will identify strategies that support a Preferred Future of wildland firefighting in the year 2020. The final report will identify administrative, budgetary and/or legislative initiatives necessary for success in 2020. DNR estimates it will transmit the Plan to the Commissioner in April 2006 so that anticipated changes can begin in the 2007-2009 budget process.

DNR will be assisted in development of the Plan by an Advisory Committee composed of a broad cross-sectional range of interest groups. The Advisory Committee will be asked to evaluate the Plan's various components prior to the development of the final Plan.

This primer is meant to provide a foundation of information for the committee. The following pages introduce some key components that affect how wildland fires are fought in Washington and that underscore the need for the Plan. Some are rooted in fire protection and the forest resource, others in policy, population dynamics or statute. All are part of the context for the Plan. They are presented in two sections:

- Wildland Fire Protection in Washington
  - History - Fire and Protection
  - The Department of Natural Resources
  - Incident Command System
  - Status of Institutional Resources
  
- Influences on Fire Risk and Protection
  - Population Growth
  - Competition for Fiscal and Other Resources
  - Forest Health and Timber Harvest Patterns

*Certain graphics on the following pages were generously provided by the Joint Legislative Audit and Review Committee (JLARC), abstracted from their DNR Fire Suppression Study, Report 05-11, June 22, 2005.*



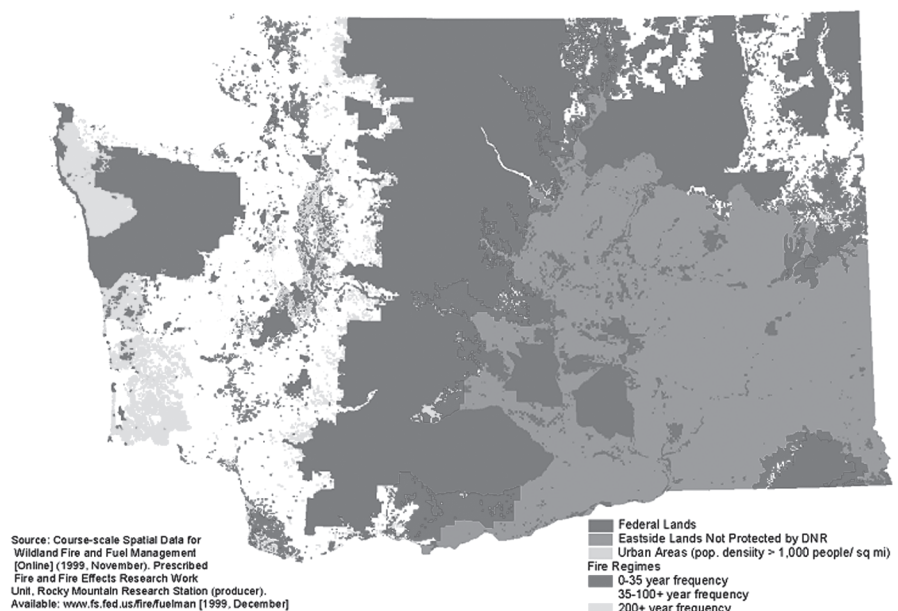
# Wildland Fire Protection in Washington

## History - fire and protection

Forest fires are an integral part of Washington's landscapes. Fires, small and large, have shaped the state's forest for millennia. Dendro-chronologists and other researchers have documented high carbon values indicating numerous forest fires long before European occupation. The log of Captain Robert Gray documented vast burns and active fires that obscured the coast from the sea. East of the Cascade Range, fire occurrences are more common and more obvious. The fire re-occurrence cycles (regimes) are generally shorter than those found in western Washington, as shown in Figure 1.

**Figure 1 — Natural Fire Regimes on State-Protected Lands in Washington**

## Fire Regimes on DNR Protection



By the mid-1800's and the early 1900's, settlers had begun extensive land clearing and timber harvesting. The results were fairly predictable. Enormous and uncontrolled wildfires swept the state. Names like the Yacolt burn, the Forks fire and the Entiat fire are familiar to historians. These three fires burned well over a million of acres and billions of board feet of timber and caused substantial loss of life and property.

Prompted by large fires in Washington and elsewhere, the Legislature acted. The first 17 years of the 20th century marked Washington's initial attempt at organized forest fire protection. The Legislature's first appropriations for fire detection and control on state and public land were in 1905. The Washington Forest Protection Association was formed in 1908 by private forest landowners to pool resources and equipment for private forestland protection. In 1911, the Legislature created county fire wardens and a state board of forest commissioners.

A compulsory state fire control law was enacted in 1917. The law required each forest landowner to provide acceptable fire control and prevention for their forestland or pay an "in lieu" annual per-acre fee for this service to be provided by the state. Forest landowners were also required to abate slash hazard conditions or be charged for abatement costs. This compulsory fire control law created the first voluntary forest patrol assessment option for private forest landowners.

The federal government also was, and is, active in federal lands protection and cooperative fire control with the states. The 1911 Weeks Act (16 USC 564-570) provided each state with a regular federal forest fire protection allocation. The importance of forests and forest products to state and national economy was recognized in the 1943 Clarke-McNary Act (16 USC 500, 513-522, 563), which broadened the fire protection portion of the Weeks Law. Sponsored by state foresters and the Forest Service, the 1950s Smokey Bear Program launched an intense public awareness campaign for wildfire prevention.

**Figure 2 –Some historic,  
large U. S. fires**

**1871 Peshtigo, Wisconsin**

Over 1,500 lives lost  
3.8 million acres burned  
Nation's worst<sup>1</sup> forest fire.

**1902 Washington and  
Oregon - Yacolt Fire**

38 lives lost  
1 million+ acres burned

**1991 Oakland–Berkeley,  
California brush fire**

At least 24 lives lost  
3,000 homes and apartments  
destroyed.  
Damage estimated at  
\$1.5 billion.



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## The Department of Natural Resources

The Washington State Department of Natural Resources (DNR) is the state's fire department for fires on private and state-owned forestlands. Currently, DNR is responsible for protecting 12.7 million acres of the roughly 22 million forested acres in the state. Of the forestlands DNR protects from fire, 10 million acres are privately owned, just over 2 million acres are state-owned forestlands, and the rest are a portion of tribal lands. The federal government is responsible for protecting roughly the same amount, 12 million acres (both forested and non-forested).

Through Chapter 76.04 of the Revised Code of Washington (RCW), the Washington State Legislature has provided direction to DNR for its fire protection role. Specifically, RCW 76.04.167(2) defines the primary fire protection mission of DNR as the protection of forest resources and suppressing forest fires, second only to saving lives. The Legislature has directed DNR to aggressively suppress wildfires. In addition, it defines the primary mission of rural fire districts and municipal fire departments as protecting and suppressing structural fires.

The 1971 Legislature established the Forest Fire Advisory Board (RCW 76.04.520). The Board is charged with overseeing the DNR fire program and making recommendations to DNR management. Seven members, appointed by the state's Commissioner of Public Lands, represent private and public forest landowners on fire-related issues such as prevention and suppression rules, expenditures, assessments and operational policies.

### Funding Fire Protection

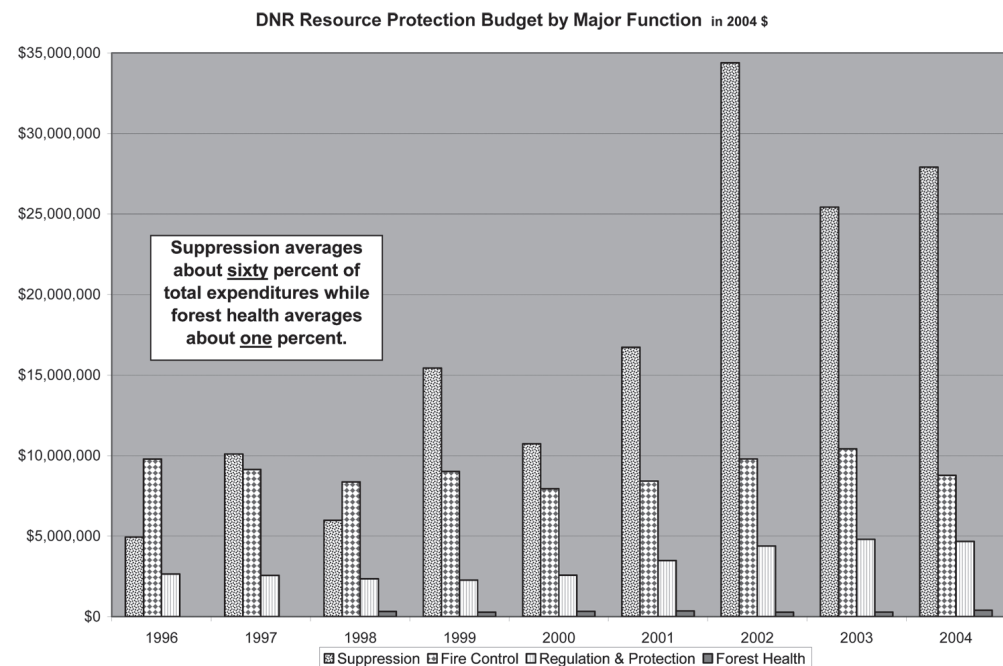
The DNR fire protection program is based on the state's 1917 Compulsory Fire Control laws. The per-acre protection cost to private forest landowners has been increased to reflect increasing costs of fire protection, and the state's eastern and western protection rates have been differentiated to reflect cost differences. The Legislature has recognized that there is a public interest in suppressing wildfires and contributes approximately a one-to-one match of state funds to landowner funds from the Forest Fire Protection Assessment (FFPA) to the pre-suppression budget.

Different parts of DNR's program are funded in various ways, and funding levels vary from year to year. Figure 3 (next page) shows how the level of funding for the major components of DNR's program has varied from 1996-2004.

**Suppression** of actual fires is usually paid for from either the Landowner Contingency Fund or the State General Fund. The Landowner Contingency fund pays for non-negligent fires caused by landowner operations (e.g., timber harvest or road construction). The General Fund covers costs of suppression of fires other than those caused by landowner operations (e.g., lightning or the general public). DNR costs for suppression on lands protected by others, such as the federal government, are reimbursed. Similarly, if DNR can legally prove negligence, then the liable party is billed for suppression costs.

**Fire Control**, as used in Figure 3, includes the costs associated with preparedness and training. The funding includes the following: General Fund-State, General Fund-Federal (State Fire Assistance), and the Forest Fire Protection Assessment Account.

**Figure 3 — Funding for DNR Resource Protection**



**Regulation and Assistance**, as used in Figure 3, includes the costs associated with burning permits, fire district assistance, fuels management, wildland urban interface mitigation and prevention education. The funding includes the following: General Fund-State, General Fund-Federal (State Fire Assistance), Forest Fire Protection Assessment Account and the Air Pollution Control Account.

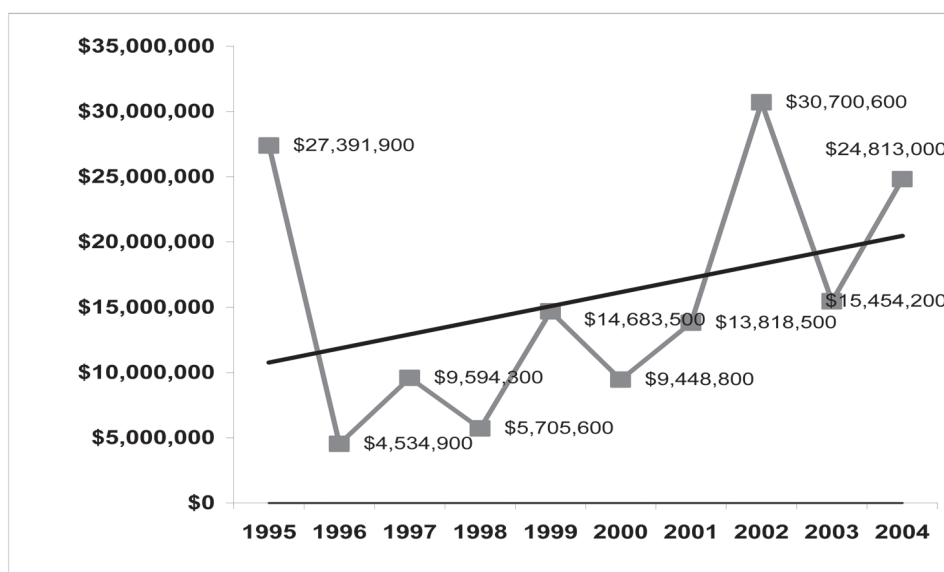
**Forest Health**, as used in Figure 3, includes the costs associated with insect and disease surveys and education/technical help to landowners and others. The funding includes the following: General Fund-State and General Fund-Federal.

## Trends

Looking at ten years of suppression cost data shows that there is an upward trend (Figure 4). Also, the ten-year trends both on the number of fires and acres burned are increasing slightly. (Figure 5)

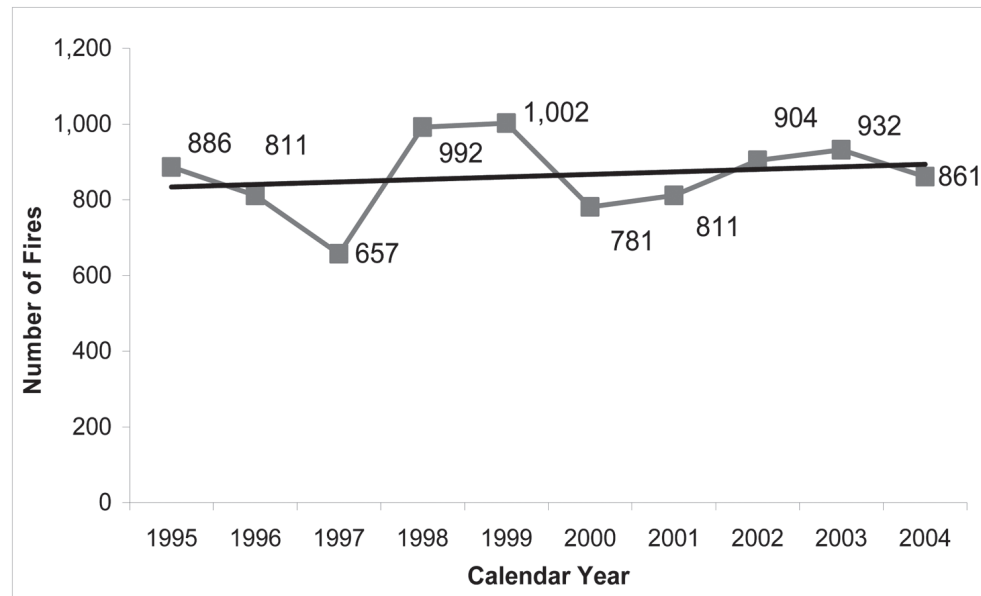
It is important to understand where fires occur. As shown in Figure 6, the location of fires has very serious implications for their size and ultimately, their costs. For the last fifteen years, 53 percent of

**Figure 4 — State Funding for DNR Wildfire Suppression is Growing (Controlled for inflation)**



Source: JLARC analysis of DNR budget submission data: some years include Disaster Response Account expenditures.

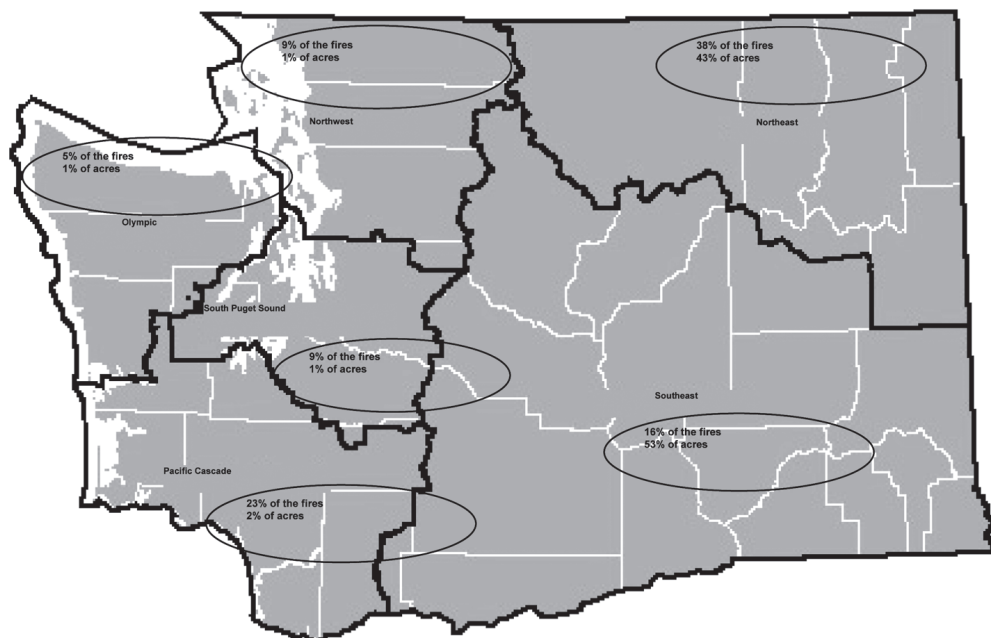
**Figure 5 — The Number of Fires on DNR-Protected Land is Increasing Slightly**



Source: JLARC analysis of DNR data.

the total fires and 96 percent of the acres burned have been in eastern Washington. Figure 6 shows the number of fires and acres burned in each of DNR's six administrative regions.

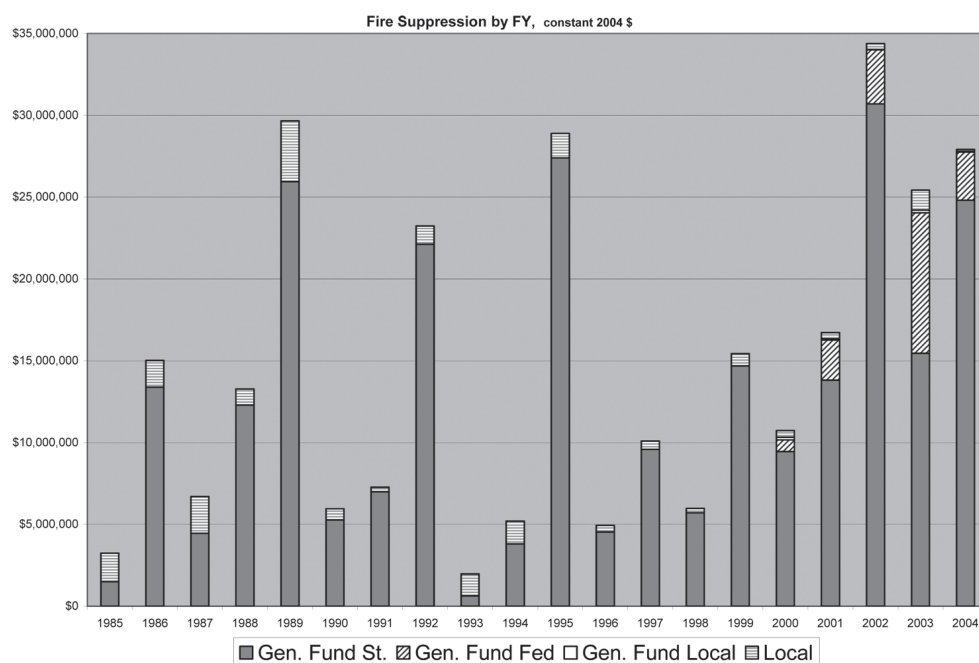
**Figure 6 — Wildfires in the DNR Regions Over the Past 15 Years**



Source: JLARC analysis of DNR data.

Finally, fire suppression funding has changed. Figure 7 shows, by fund, how funding has changed. Of particular note is the recent growth in General Fund-Federal, which is reimbursement for state expenditures on federally protected lands. Given the reduced federal staffing and other firefighting resources and the increased forest health problems and inability to deal with them on federal lands, such expenditures will only increase. While the state may be reimbursed, the opportunity and other costs are high since Washington largely has “volunteer” wildfire fighting forces.

**Figure 7 — Wildfire Suppression Costs by Fund**



Source: DNR Financial Data

## Incident Command System

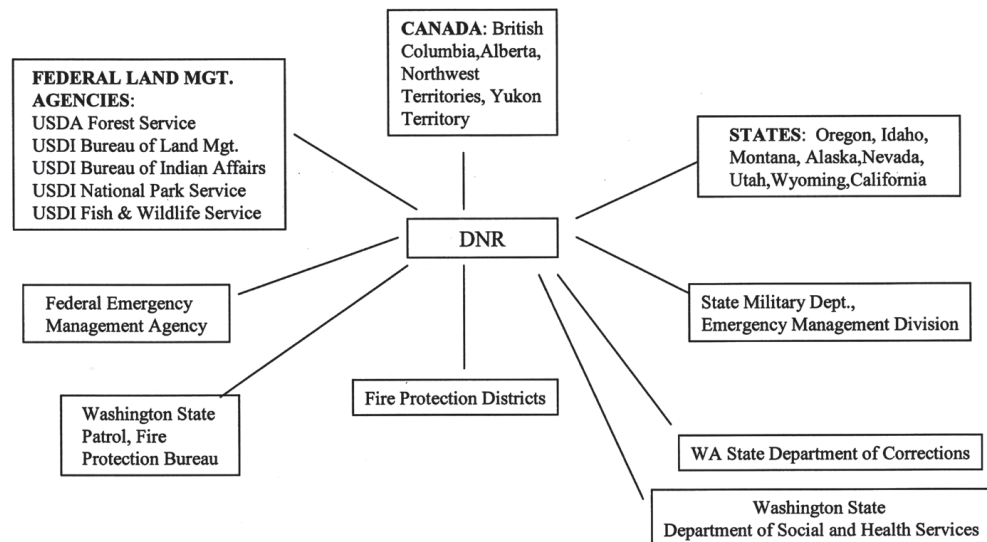
The Incident Command System (ICS) is the cornerstone of wildfire fighting. It is a management system of command and control that is based on required specified skills that any ICS-rated individual must possess and continually update. It allows interchange of people from various organizations, whether state, local, federal or private. The theory and practice is that anyone with the ICS rating can perform the specific functions on essentially any type of incident for any organization. Many of the key ICS requirements are experience-based, which creates a tension. The required experience profiles can take decades to complete, leading to serious questions about filling key leadership positions, both in the near and long term.

While the preponderant use of ICS outside of the military has been for wildfires, there is the real and very current issue of “all risk” incidents. As the resident experts in large scale critical incident management DNR and other Washington State ICS individuals have been assigned to functions such as the World Trade Organization disturbances in Seattle and the Gulf Coast hurricanes. Given that most wildfire participants are “volunteers” in the sense that their “day jobs” are not full-time wildfire, any response to any incident, “all-risk” or otherwise, is a very real issue affecting costs, scheduling and accomplishment of their regular work.

## Status of Institutional Resources

Partnerships make wildland fire firefighting possible in Washington. Washington, like most states, cannot afford a full-time wildfire organization. Our wildland firefighting is based on a series of agreements, compacts or laws that facilitate and/or permit resources to be shared, sometimes across state or international borders. Figure 8 shows many of these partners.

**Figure 8 — DNR’s Firefighting Partners**



A response to a wildfire is scaled up or down, based on risk and probability that local firefighters can or cannot contain a fire within a reasonable timeframe while still maintaining local initial attack responsibilities. When needed, additional resources are dispatched from either DNR or from one or more of our partners. Experience has shown that risk and costs are both substantially reduced when fires are kept small, the central policy objective for the DNR wildfire program. The policy target is to contain 95 percent of all fires to less than ten acres.



At some point, a fire exceeds the capability of regional resources, requiring a much larger fire organization. Currently, there are five inter-agency Type 2 Incident teams that can be mobilized. Each team has about fifty people that are specialized in various functions, ranging from planning, and logistics to line operations. Additional resources, such as organized crews, are added to the dispatch to augment the core Type 2 resources.

During fire season, requests for resources can exceed availability. There are various arrangements and agreements that control dispatch priorities, whether local, intra-state, inter-state, or in some cases, international. The objective is to fairly share scarce resources among all the partners.

## Partnership Roles

Throughout the country and in Washington, fire suppression efforts rely heavily on various interagency partnerships, such as those shown in Figure 8. The responsibility for an individual fire, that is, who “owns” the fire, can be simple or quite complex for a large fire that is burning on lands that often have a mix of suppression jurisdictions.

Within their jurisdiction, local fire districts are responsible for suppressing all fires. There are many instances in which both DNR and fire districts protect the same acre. Here, landowners pay both the fire district levy and the state’s forest fire protection assessment. Typically, fire districts do not pay DNR for its assistance; however, under some circumstances DNR may pay fire districts for their assistance. The relationships are defined by a series of bilateral agreements between the fire district and DNR. The lack of a uniform agreement has led to policy and operational complications. As agreements expire, DNR is attempting to negotiate more uniform agreements.

When local fire districts are overwhelmed and there are homes threatened in their protection district, the Washington State Patrol can declare a State Mobilization. By law, the focus of State Mobilization is structure protection. Given the tactical realities of protecting structures that are in an otherwise forested setting, the wildland-urban interface and elsewhere, they may also fight the wildland portion. In a State Mobilization, DNR is often involved in suppressing the wildland portion of the overall fire but not in the actual fighting of structural fires.

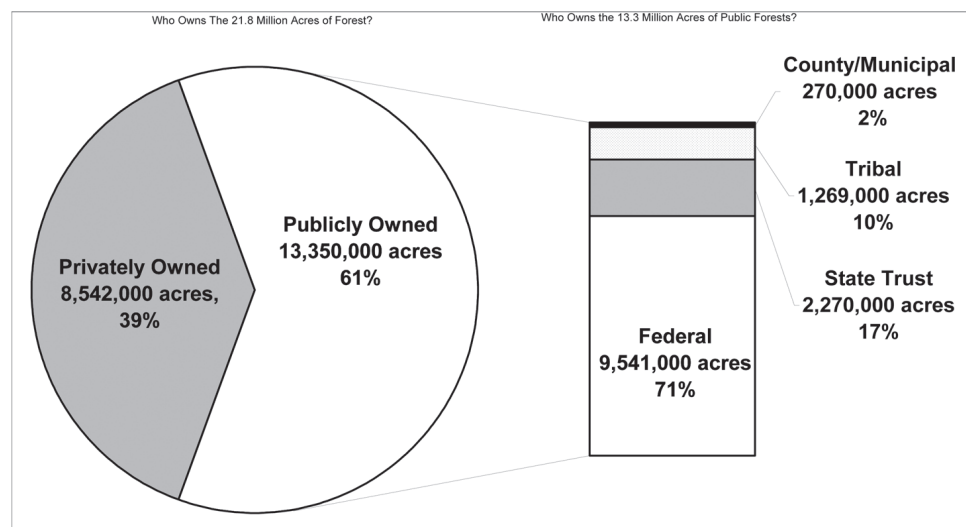
The U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service and Fish & Wildlife Service are the five federal land management entities responsible for fire suppression. Interagency agreements define the instances when agencies may offer assistance without charging another; these circumstances are limited. Larger fires, now often lasting several weeks, have cost-sharing agreements that are negotiated for individual incidents.

The Federal Emergency Management Agency (FEMA) is not directly responsible for fire suppression. However, in defined circumstances, FEMA will pay for certain costs for fires that threaten to become major disasters. If 50 or more homes are threatened, then FEMA cost reimbursement may be available for 75 percent of eligible suppression expenses.

Historically, the Forest Service has been the major federal player, a natural outcome of land ownership patterns and the nature and extent of the resources managed by this entity. The organizational framework and the number of available U.S. Forest Service resources have been substantially reduced. With reduced employee levels, there are now fewer federal employees available to participate. One positive result is that Washington's five inter-agency Type 2 Incident teams are now all inter-agency where before there were separate federal and state teams.

There are some significant consequences of reduced federal participation. As shown in Figure 9, there are about 9.5 million acres of federal forestlands in Washington, most U.S. Forest Service, mak-

**Figure 9 — Forestland Ownership in Washington State**





ing up about 43 percent of the 21.8 million forested acres in the state. The large extent of federal forests and the fuel build-up and their well-documented forest health problems compound the public policy problems. Even if the federal government reimburses all partners for their nominal expenses, there are other real costs, including accelerated resource losses, which are unaddressed.

## Shifts in Federal Wildfire Management Objectives

The direction on federal land is materially different than the direction the Legislature has given DNR: protect forest resources (second only to saving lives) and to aggressively suppress wildfires. This is an artifact of various legal and policy objectives. Laws and policies create frames of reference, whether on state-protected or federal lands. The stark contrasts between federal and state objectives place additional demands on all the partners to understand each other and to fight fire with different rules of engagement. However, the net result is additional time spent on federal fires and additional acres burned.

The following quote comes from the “Quadrennial Fire and Fuel Review Report<sup>ii</sup>” from the five major federal land management agencies.

*The Quadrennial Fire and Fuel Review Report looks at three [federal] mission strategies for the future. Allowing fire to play its natural role in ecosystem sustainability with the given social, economic, and political environment is the cornerstone mission strategy. This requires fire management to expand its role in resolving fuel accumulation problems through expanded large-scale landscape treatments and by applying appropriate management responses to all ignitions. Linked to this is a secondary mission strategy of promoting fire adapted human communities rather than escalating protection of communities at risk in the WUI [wildland-urban interface]... An equally important component will be reengaging communities and property owners in an effort to increase community awareness of wildland fire risk and to balance responsibilities for public safety and return habitats to ecosystem sustainability... An increased demand for fire management resources and expertise in incident management was identified as the focus of the third core mission strategy.*

*The goal is a paradigm shift, where the public would expect that fire would be allowed play its natural role and question why we would propose to put fires out.*

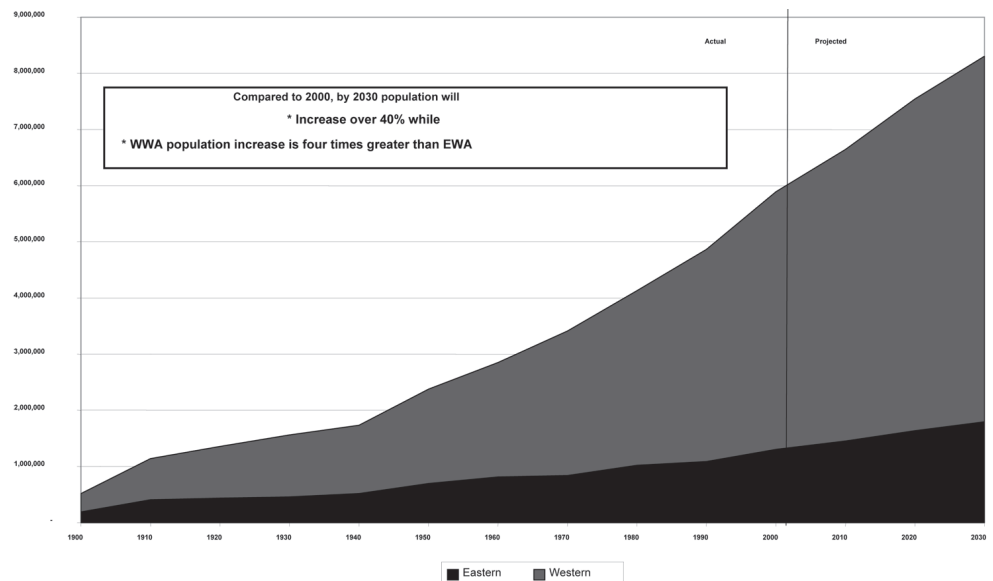
The purpose of identifying the contrasts here is to fully characterize the policy objectives and understand the implications of how partnerships now work or might work in the future.

# Influences on Fire Risk and Protection

## Population Growth

The Governor's Office of Financial Management forecasts population to increase by over 40 percent in thirty years, with 80 percent of the increase in western Washington. Population increase is a key factor that will shape the future of wildland fire protection. Much of the growth will occur in the wildland-urban interface where development meets the forest. While the data for the state's prospective development is not currently available, it is informative to look at the national data. Nine percent of the land area of the United States and 31 percent of U.S. homes are in the wildland-urban interface and that growth rates within it are triple the rates elsewhere.

**Figure 10 — Actual and Projected Population of Washington State**



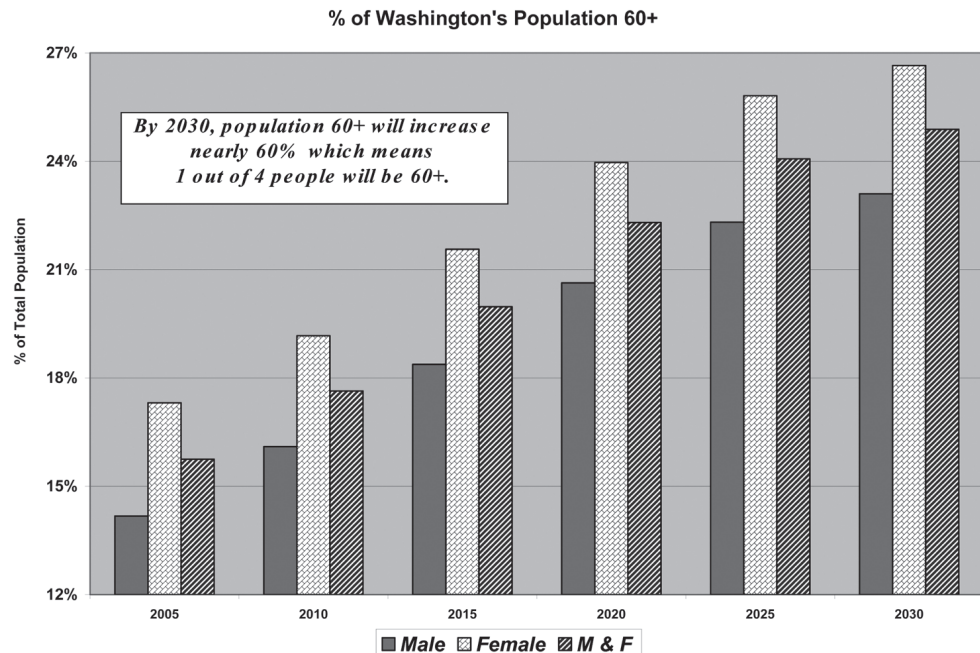
Source Data: Office of Financial Management, State of Washington

Compared to today, the forecast shows the population will increase by almost 2.4 million. This means that there will be some 0.6 million new dwelling units, many of which will be single-family homes located in the wildland-urban interface. Substantially increased fire protection capabilities are necessary to adequately protect life, developed property and forest resources.

## Competition for Fiscal and Other Resources

There are a number of broad social and political forces that shape public policy. The Washington State Constitution requires substantial educational funding. Crime and societal protection commands an ever-increasing share of the state's budget, as do various programs to support people in need and the health costs of the state's increasingly aging population. The demographics of Washington's population, as shown in Figure 11, demonstrate the changing dynamics. This aging population can also be expected to increase the number of residences in the wildland-urban interface as people retire and move closer to the forested areas that they loved to visit when they were working in the urban areas.

**Figure 11 — Population Older than 60 years**



Source: Office of Financial Management Data

Fire occurrence and costs have increased despite attempts to control costs. The public policy risks and risks to the forest landowners and the public have substantially increased since the 1997 *“Fire Pro-*

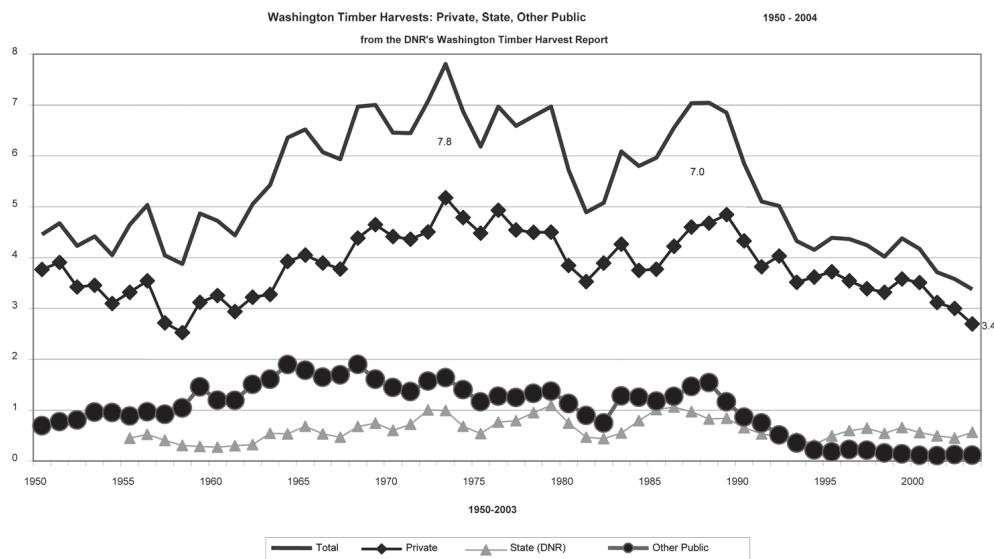
*gram Review*”, the last in-depth review of Washington’s wildfire program.

It is timely to look at the current legal structure and partnerships. The roles and expectations of DNR’s wildfire partners need to be clear. DNR’s wildfire partners include entities such as the Washington State Patrol, the state’s 600+ fire districts, the Washington National Guard, the five federal land management agencies and the Native American tribes. Since 1997, a large number of specialized contractor crews have been working with the traditional inmate labor forces, long used in Washington’s wildfire fighting.

## Forest Health and Timber Harvest Patterns

The timber harvest rate is a significant issue for several reasons, including its effect on employment, forest health and fire risk—particularly where the rate of forest growth is greater than the rate of harvest. Where growth exceeds harvest, the net result is an increase in forest fuels that can contribute to uncharacteristically intense fires and lower forest health.

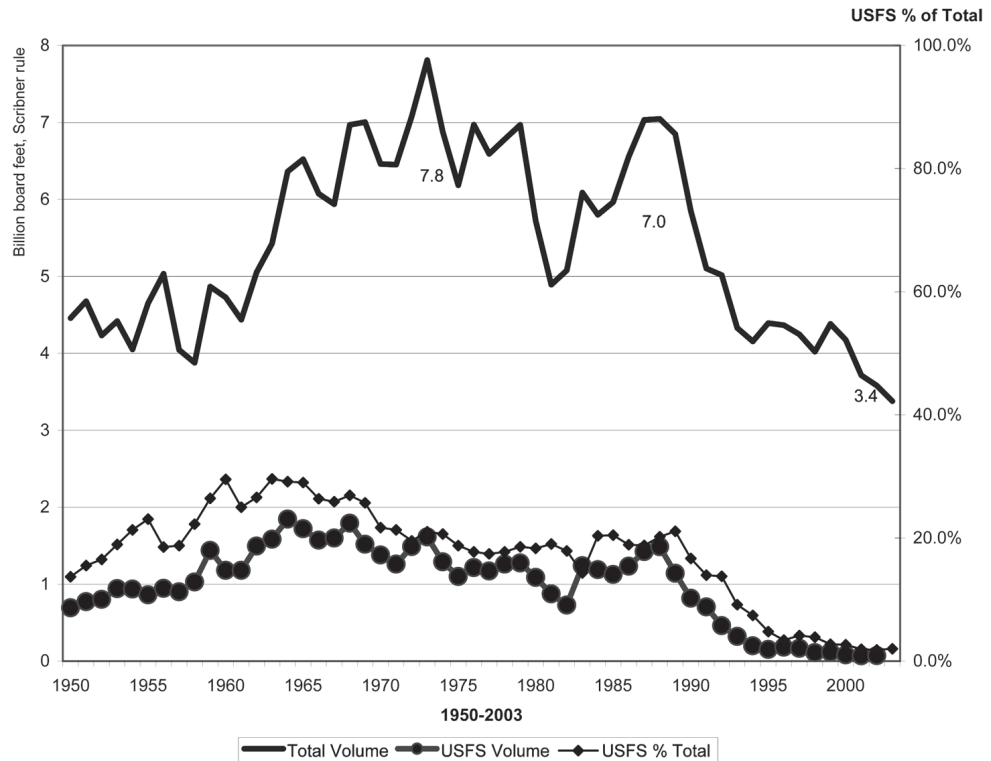
**Figure 12 — Timber Harvest by Ownership**



Who is harvesting timber has substantially changed as well as the total amount of timber harvested. In Figure 12, the “Other Public” shows the impact of the decline of the harvests on the US Forest Service lands. In Washington, National Forests include about 9 million acres and historically have contributed 15-20+ percent of the total harvest. Today, their contribution is about 2-3 percent of the total harvest. See Figure 13, next page.

This disparity between harvest and growth and the resultant fuel build-up on the federal lands are major forest health and suppression costs issues. How these factors interact with workload issues will be explored later in the research process for the Plan.

**Figure 13 — Washington Timber Harvests: Total and USFS**



Based upon volume, the long-term harvest patterns have changed. Eastern Washington's percent of the total harvest is 14.5 percent for the period 1869-2002 (Washington Timber Harvest 2002, DNR), as shown in Table 1. Because eastern Washington's volume per acre harvested is often less than half of that in western Washington, the number of acres harvested does not directly translate from the volume harvested by region.

Forest health concerns and harvest of fire-damaged timber in eastern Washington, have increased harvested acres. Regulatory issues and conversion of forest to non-forest uses in western Washington have contributed to the relative increase in the timber harvested from non-federal lands in eastern Washington. The rates of harvest on federal lands are substantially below the growth rates; the result is reduced forest health and increased fire risk.

**Table 1 — Eastern Washington Harvest Volume  
as a % of Total Volume.**

Time Period	1869-2002	1949-2002	1985-2002	1995-2002
E WA % of Total Harvest	14.5%	16.6%	21.1%	23.2%

Source Data: WA Timber Harvest 2002. DNR







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## Next Steps

This primer will be followed by a series of DNR papers providing more in-depth analyses of key factors. The Advisory Committee will review these papers. This is designed to elucidate issues and address key public policy questions. The Committee will be asked to help DNR answer these key questions.

The “2020 Strategic Plan for Wildland Fire Protection on Lands Protected by the State of Washington” will seek to answer the following key public policy questions. The answers are designed to improve both the effectiveness and efficiency of wildland fire fighting on state-protected forests:

- 1. How can forest health principles be used to reduce the costs and impacts of wildfire?*
- 2. What are the appropriate roles of prevention, community assistance and education in the overall program?*
- 3. How can we provide appropriate public safety for an increased population while continuing to suppress wildfires?*
- 4. What are the appropriate roles for the various firefighting partners?*
- 5. How can we improve training and recruitment to provide the necessary human resources?*
- 6. What is the best role for contractors?*
- 7. How should the State of Washington participate in “all-risk” incidents, inside and outside of the state?*
- 8. In the process, are there legislative changes that would increase efficiency and effectiveness of fire protection in Washington?*


The questions are foundational. The answers provide a strategic direction not available today.

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i From <http://www.infoplease.com/ipa/A0778688.html>.

ii “Quadrennial Fire and Fuel Review Report”, June 2005 by U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish & Wildlife Services, National Association of State Foresters.





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# **Appendix B**

## **Advisory Committee Charter for the Development of a 2020 Strategic Plan for the Wildland Fire Protection on Lands Protected by the State of Washington**

**Department of Natural Resources, November 1, 2005**

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### **Legal Context**

The Washington State Department of Natural Resources (DNR) is the state's fire department for fires on private and state-owned forestlands. The Legislature has directed the DNR to protect some 12+ million of the 22 million forested acres in the state.

The Legislature created the DNR in 1957 to increase the effectiveness and efficiency of various land management, regulatory and protection services that were dispersed in several governmental entities. Primary statutory direction is found in Chapter 76.04 of the Revised Code of Washington (RCW). RCW 76.04.167(2) defines the primary mission of the DNR as the protection of forest resources and suppressing forest fires, second only to saving lives.

The Legislature had directed the DNR to aggressively suppress wildfires. “Further, it is the primary mission<sup>1</sup> of rural fire districts and municipal fire departments to protect and suppress structural fires.”

The public’s concern about air quality has increased. Public health, public safety, enjoyment of natural attractions and forest health can all be served through the application of the various provisions of law and rules, in particular the State’s Smoke Management Plan. The Plan, in effect since 1969, has been modified several times to acknowledge the various trade-offs associated with outdoor burning on forest lands. The Smoke Management Plan was designed to meet the requirements of the Washington Clean Air Act (RCW 70.94), Forest Protection laws (RCW 76.04) and the United States Clean Air Act (42 USC 7401 et seq.). The Plan acknowledges the role of fire in forest ecosystems and allows the use of fire under controlled conditions to maintain healthy forests.

Second Substitute Senate Bill 6144, passed by the Legislature in the 2004 Session, directed the Commissioner of Public lands to develop a statewide plan for forest health. In the first of the required DNR annual reports to the Legislature, the “Washington State Strategic Plan for Healthy Forests”, December 30, 2004, outlined the clear connections of healthy forests to fire and public safety. The Report notes, “Fire ecology is the key to restoring proper forest health.” The Bill created a fourteen-member Forest Health Strategy Work Group that identified a series of comprehensive recommendations to improve the health of Washington’s forests.

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## Introduction

Fire has been and will continue to significantly impact Washington’s forests and the quality of life in the state. Fire is a major element in the forests of Washington. The direct and indirect fire consequences on the state’s economy and ecology are real but not constant, resulting in heightened public policy concerns. In part, they are created by the interaction of the following factors:

- Changes in weather patterns;
- Drought;
- Increased fuel loading;
- Changes in forest ownership patterns and management objectives;

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<sup>1</sup> “DNR Fire Suppression Study”, Joint Legislative Audit and Review Committee, Report 05-11, June 22, 2005, page 7.

- Costs of fire fighting;
- Fire fighter safety;
- Critical training, recruitment and retention of specialized skills;
- Population increases;
- Proliferation of homes in the forest;
- Forest health in all ownerships are less resistant to uncharacteristic, economically or environmentally undesirable wildfire, windstorm, pests, disease and other damaging agents: and
- Forests are less able to recover following biological or environmental disturbances.

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## The Need for a Strategic Plan

The Governor's Office of Financial Management forecasts population to increase by over 40 percent in thirty years, with eighty percent of the increase in western Washington.

Fire occurrence and costs have increased despite attempts to control costs. The public policy risks and risks to the forest landowners and the public have substantially increased since the 1997 "Fire Program Review", the last in-depth review of Washington's wildfire program.

The interaction of the factors identified in the previous section creates a need to comprehensively evaluate the policy and strategic direction of wildfire on state-protected forest lands. It is timely to look at the current legal structure and partnerships. The roles and expectations of our wildfire partners such as the Washington State Patrol, the state's 600+ fire districts, the five federal land management agencies, the number of inmate crews and the increased availability of specialized contractors should be evaluated to understand how wildfire fighting might be done differently both today and tomorrow. There are significant questions about the appropriate funding levels and funding mechanisms and the mix of fire prevention, pre-suppression and suppression activities.

The Incident Command System (ICS) is the cornerstone of wildfire fighting. It is a management system of command and control that is based on required specified skills that any ICS-rated individual must possess and continually update. It allows interchange of people from various organizations, whether state, local, federal or private. The theory and practice is that anyone with the ICS rating can perform the specific functions on essentially any type of incident for any organization. While the preponderant use, outside the

military, has been wildfires, there is the real and very current issue of “all risk” incidents. DNR and other Washington State ICS individuals have been assigned to functions such as the World Trade Organization disturbances in Seattle to the Gulf Coast hurricanes. Given that most wildfire participants are “volunteers” in the sense that their “day jobs” are not full-time wildfire, any response to any incident, “all-risk” or otherwise, is a very real issue.

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## **Role of the members of the Advisory Committee**

Members of the Advisory Committee have been chosen for their expertise and experience regarding wildfire on forest lands protected by the State of Washington or its duly created components. Their role on the committee will be to use their knowledge and expertise to challenge or verify the Department’s 2020 Strategic Plan for Wildland Firefighting in the State of Washington.

Today, the Plan is only conceptual. As background and other components are drafted, the DNR actively seeks Advisory Committee input. In particular, the DNR asks for critical evaluation the Preferred Future for 2020, the suite of assumptions regarding Values, Goals, Objectives and associated Strategies necessary to achieve the Preferred Future.

After final analyses by the Advisory Committee, the DNR will evaluate all comments. The DNR’s objective is to produce a final *“2020 Strategic Plan for the Wildland Fire Protection on Lands Protected by the State of Washington”* and to transmit the *“2020 Strategic Plan”* to the Commissioner of Public Lands prior to May 2006.

The Advisory Committee members will be compensated for their time and travel expenses in accordance with state law. The Department will provide staff support to the Advisory Committee.

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## **Advisory Committee - Scope of Work**

Under the assumption that the current legal framework are near-term givens, the focus of the Advisory Committee is to evaluate the content of a *“Draft 2020 Strategic Plan for the Wildland Fire Protection on Lands Protected by the State of Washington”*. The DNR will provide you with various draft components that will ultimately be incorporated into the *“Draft 2020 Strategic Plan for the Wild-*

*land Fire Protection on Lands Protected by the State of Washington”; the DNR is seeking your review of these component and draft products.*

To help the Advisory Committee in their work, there are certain questions that may help members.

***Given the changing ecological, social and economic forces, does the Strategic Plan adequately address their interactions?***

***Does the Strategic Plan’s view of the Preferred Future in 2020 represent a set of conditions that achieve a desired balance of public policy objectives?***

***Does the Strategic Plan adequately recognize the role of forest health in wildland fire?***

***Does the Strategic Plan define appropriate roles for the various partners such as the fire districts, contractors and others?***

***Does the Strategic Plan adequately address “all risk” responses?***

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## **Key Principles and Assumptions**

- Current laws, rules and contracts remain in place, unless expressly amended.
- Funding will continue to be limited.

- The mix and location of various fire program resources can change.
- The focus will be on the strategic direction, not near-term tactical or operational issues.

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## **Advisory Committee: Invited Membership**

**The Honorable Senator Ken Jacobsen,**

*Chair, Natural Resources, Parks and Shorelines Committee*

**The Honorable Senator Margarita Prentice,**

*Chair, Ways & Means Committee*

**The Honorable Representative Helen Sommers,**

*Chair House Appropriations Committee*

**The Honorable Representative Brian Sullivan,**

*Chair, Natural Resources, Ecology and Parks Committee*

**The Honorable Bud Hover, Okanogan County Commissioner**

**Steve Fraidenberg, Fire Management Officer, Quinault Nation**

**John St. Pierre, Natural Resource Director,**

*Confederated Tribes of the Colville Nation*

**Tom Robinson, Timber Coordinator,**

*Washington State Association of Counties*

**Sharon Colby, Commissioner,**

*WA Fire Commissioners Association*

**Dave LaFave, Fire Chief of Cowlitz 2 Fire Rescue**

**Mike Matlick, Acting State Fire Marshal**

**Paula Swedeen, Environmental Planner,**

*Washington Dept. of Fish and Wildlife*

**Peter Heide, Washington Forest Protection Association**

**Linda Steinmann, Budget Assistant,**

*Office of Financial Management*

**Mitch Friedman, Executive Director, Conservation Northwest**

**Maurice Williamson, Washington Farm Forestry Association**

**Carl Gossard, Assistant Director for Wildfire Operations,**

*Bureau of Land Management*

**Bruce Gryniewski, Executive Director,**

*Washington Conservation Voters*

**Tom Laurie, Tribal Government Liaison,**

*Washington Department of Ecology*





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# Appendix C

## Market & Non-market Values

Abstracted from “A Desirable Forest Health Program for Washington’s Forests”<sup>1</sup>

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### Market and Non-market Values Associated with Fire Risk Reduction Treatments

(Extracted from the report entitled “*Investigation of Alternative Strategies for Design, Layout, and Administration of Fuel Removal Projects*”, section on *Market and Non-Market Values*, College of Forest Resources, Rural Technology Initiative, University of Washington, July 2003: [www.ruraltech.org](http://www.ruraltech.org))

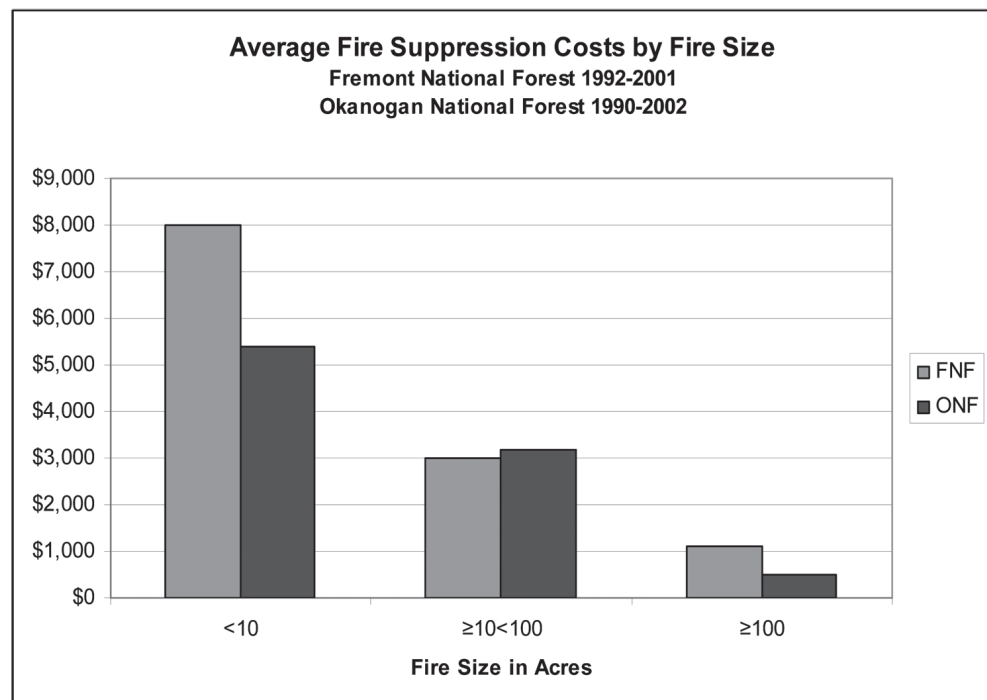
**Introduction:** *As a consequence of large intense forest fires in the inland west over recent years, considerable public attention is being directed at the question of how to reduce hazardous fuel loads from the overly dense forests that characterize the region. Removal of the many small trees that make up these fuel loads is known to be costly. While large trees can be removed for lumber and other product values as reflected in the market, the market value for the smaller logs may be less than the harvest and hauling charges, resulting in a net cost for thinning operations that are needed to lower fire risk. However, failure to remove these small logs results in the retention of ladder fuels that support the transfer of any ground fire to a crown fire with destructive impacts to the forest landscape. Many non-market benefits or avoided costs are not being considered in the market computation that only considers the market value for the log relative to the cost of delivering the logs to market. A first attempt at estimating these costs and benefits appears to show that the benefits will likely exceed the costs as justification for more aggressive treatments to reduce fire risk. There are however many different beneficiaries complicating the issue of who should pay.*

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<sup>1</sup> December 2004 report, “A Desirable Forest Health Program for Washington’s Forests” Appendix 5 at <http://www.dnr.wa.gov/htdocs/rp/forhealth/fhswgc/foresthealthreport.pdf>.

**Benefits/avoided costs of reducing fire risk:** An analysis of fire risk and hazardous forest fuels on the Fremont (OR) and Okanogan (WA) National Forests indicates that the negative impacts of crown fires are underestimated and the benefits of government investments in fuel reductions are substantial. Perhaps most obvious is the escalating cost of fighting forest fire, which nationally has been in the billions of dollars during recent years. Similarly, there is the value of avoiding facility losses and fatalities that result from forest fires. Communities value a lower fire risk and reduced smoke. Forest fires destroy visual aesthetics and limit recreational opportunities. The United States Congress has historically placed a very high value on species protection as evidenced by laws such as the Endangered Species Act or the National Forest Management Act yet irreplaceable habitats for threatened and endangered species may be lost when forests fires are more destructive than historical norms. Valuable timber resources are destroyed. Fires also convert the carbon stored in forest biomass to smoke reducing the opportunity to produce long lasting pools of carbon stored in forests and products while adding to atmospheric carbon and global warming. Fires consume biomass that otherwise could be used for clean energy conversion and green energy credits.

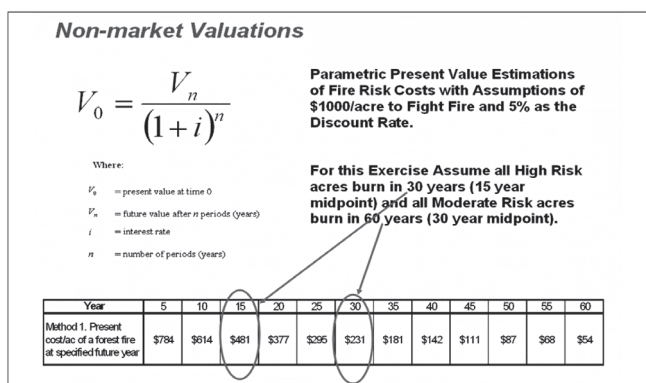
**Figure 1 — Average fire suppression costs — Fremont and Okanogan National Forests**



Regeneration after fires is problematic and costly and rehabilitation investments are often needed to avoid serious erosion, sedimentation, and water contamination. If forests are thinned, the resulting increase in available surface water could benefit salmon habitats, municipal reservoirs, and agricultural irrigation. Rural economic development benefits would result from the taxes and rural incomes generated by fuel reduction activities. Since economic activity in these regions has been in decline as a consequence of lower federal timber harvests, any reduction in unemployment has higher than normal leverage on state and local finances by lowering assistance costs.

Many scientific studies have shown that forests thinned to remove fuel loads are unlikely to experience crown fires. Accounting for the full value of this reduced risk exposure, however, must take into consideration both the predicted costs and the timing of future fire events. While it is impossible to predict exactly when a future fire might occur in a specific location, we do know that due to decades of fire suppression, the time since last ignition in many forests is well beyond previous fire return cycles and that present fuel loads are well outside of historic levels. Fire ecologists agree that the question is not whether these forests will burn but when.

To illustrate how the relative costs and benefits of investments in hazardous fuels removal treatments to reduce risk of crown fires might be considered, a parametric table can be constructed to display the present value of anticipated future costs associated with failure to reduce risk. For this example, we will assume that all acres of forests with a present high risk, if left untreated, will burn sometime in the next 30 years while all those forests considered at moderate risk will burn sometime in the next 60 years. If there is an equal probability of each acre burning in any year during the assigned interval then for approximation purposes we can assume that an average time for all acres to burn is equivalent to one-half the interval. More complex models have been evaluated producing similar results.



In other words, an equal probability that all acres burn sometime in 30 years means an average time to burn of 15 years and correspondingly, given a 60-year interval, the average burn time will be 30 years. If we further assume, as is often done for financial analysis, that an inflation-adjusted interest rate of five percent is representative of the average anticipated cost of money throughout the risk interval then we have what we need to discount future cost estimates to present dollars. In the example above, an estimated future average fire fighting cost of \$1000 per acre is used to demonstrate the present value of a future liability. This example shows that every dollar that will be needed to fight forest fires during the 30-year period for high risk represents \$0.48 of anticipated cost exposure today and during the 60-year period for moderate risk represents \$0.23 today. Conversely, investments in fuels removals today are worth the savings represented by these present value estimates of costs avoided if fires do not occur. Other non-market values of interest can be similarly assessed and then summed to estimate broad present benefit from investment in risk avoidance.

The following table shows present value estimates of avoided future losses associated with a number of market and non-market values. Also displayed for comparison are Forest Service contract preparation costs and operational costs. Future values are taken from a variety of governmental and non-governmental information sources while contract and operational estimates are derived from figures provided by the Okanogan and Fremont National Forests as well as from interviews with harvest contractors. Treatments are assumed to be forest thinnings within the understory that leave approximately 40-100 of the biggest trees per acre (TPA). A more rigorous explanation of this estimation methodology and source information can be found in the publication *“Investigation of Alternative Strategies for Design, Layout, and Administration of Fuel Removal Projects”*, in the Market and Non-Market Values section, at [www.ruraltech.org](http://www.ruraltech.org)

**Table 1. Summary table of costs and benefits from fire risk reductions**

<i>Treatment Benefits</i>	Value per acre	
	High Risk	Moderate Risk
Fire fighting costs avoided	\$481	\$231
Fatalities avoided	\$8	\$4
Facility losses avoided	\$150	\$72
Timber losses avoided	\$772	\$371
Regeneration and rehabilitation costs avoided	\$120	\$58
Community value of fire risk reduction	\$63	\$63
Increased water yield	\$83	\$83
Regional economic benefits	\$386	\$386
<b>Total Benefits</b>	<b>\$2,063</b>	<b>\$1,268</b>
<i>Treatment costs</i>		
Operational costs	(\$374)	(\$374)
Forest Service contract preparation costs	(\$206)	(\$206)
<b>Total Costs</b>	<b>(\$580)</b>	<b>(\$580)</b>
<b>Positive Net Benefits from Fuel Removals</b>	<b>\$1,483</b>	<b>\$706</b>

Additional benefits from fuels reductions such as habitat restoration, water quality protection, carbon credits, and others are more difficult to estimate but are generally considered to be of high public value. Further research is needed to quantify such benefits; however, it should be apparent that addition of such considerations would serve to increase further the net value of public investments in forest fire risk reduction.

Potential negative costs associated with harvest activities to reduce hazardous fuel loads should also be considered, including environmental impacts of soil compaction, damage to leave trees, and road sediments. However, these costs are difficult to estimate and in general can be avoided with due diligence. Compromises to habitat quality for some species may decline while others increase, creating trade-offs that are difficult to evaluate, but these changes are not likely to be as harmful as the impacts of catastrophic wildfires.

While the values assigned to the benefits from fuels reductions that have been listed above can rightly be considered coarse estimates, they have been shown to be legitimately defensible and intentionally conservative. These figures suggest that the benefits of fire risk reduction are of high value and generally of much higher value than any market losses resulting from thinning to reduce the fire risk. It is worthy to note that many areas of the forests studied in this investigation showed positive net returns from log sales after thinning simulations when some larger trees were removed as part of the fuels reduction activity. However, even with an assumed net cost of fuel reduction operations, the results of this cost/benefit analysis clearly show that the future risk of catastrophic fire is far costlier to the public than investments made today to protect against such eventuality.

**Magnitude of Potential Benefits:** An analysis of Fremont and Okanogan National Forest inventory data indicated that 1,307,667 acres (greater than 75 percent of the total forest area) are at moderate to high risk of crown fire. Based upon present value estimations above, the total no-action liability for these at-risk forests is greater than two billion dollars. The net public benefit of hazardous fuels reductions after subtraction of operations costs for just these two National Forests is estimated to be greater than 1.3 billion dollars.





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## Appendix D

# Cash flow and Avoided Costs

Abstracted from “A Desirable Forest Health Program for Washington’s Forests”<sup>1</sup>

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### Fire Preparedness, Suppression and Prevention Costs

Figure 1 shows that fire preparedness costs (personnel and equipment) for DNR protected land have increased over the last two biennia largely in response to a more than doubling of fire suppression costs (fighting fires). Over the last two biennia, fire suppression costs have increased by \$25 million to reach almost \$60 million per biennium. Fire suppression costs are more random from year to year than preparedness costs depending upon drought and other weather conditions.

Figure 2 shows that the fire suppression costs per acre burned appear to have more than doubled over the last several years from just under \$1,000 per acre to over \$2,000.

Figure 3 shows the suppression cost for the Okanogan/Wenatchee National Forest as a function of the number of acres burned. While the cost is very large for small tracts it is somewhat lower for the very large tracts. Federal forests tend to have larger blocks of contiguous acres, which are also generally at greater distance from populated areas so the suppression activity is less concentrated.

While there is some funding devoted to prevention activities such as education and technical assistance, the amounts are minimal relative to the cost of preparing to fight fires and trying to suppress them once they start, and these suppression costs do not include the costs associated with the damage created by fires and post-fire restoration activities.

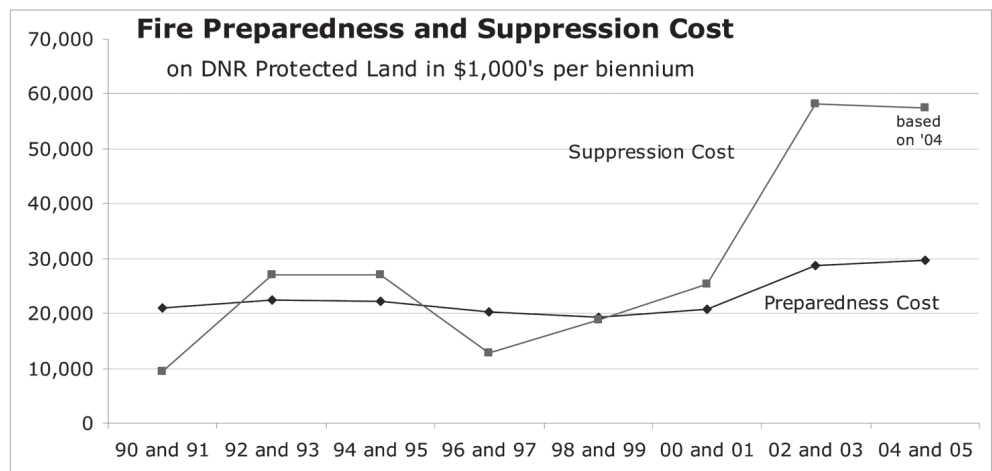
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<sup>1</sup> December 2004 report, “A Desirable Forest Health Program for Washington’s Forests”, Appendix 6 at <http://www.dnr.wa.gov/htdocs/rp/forhealth/fhswgc/foresthealthreport.pdf>.

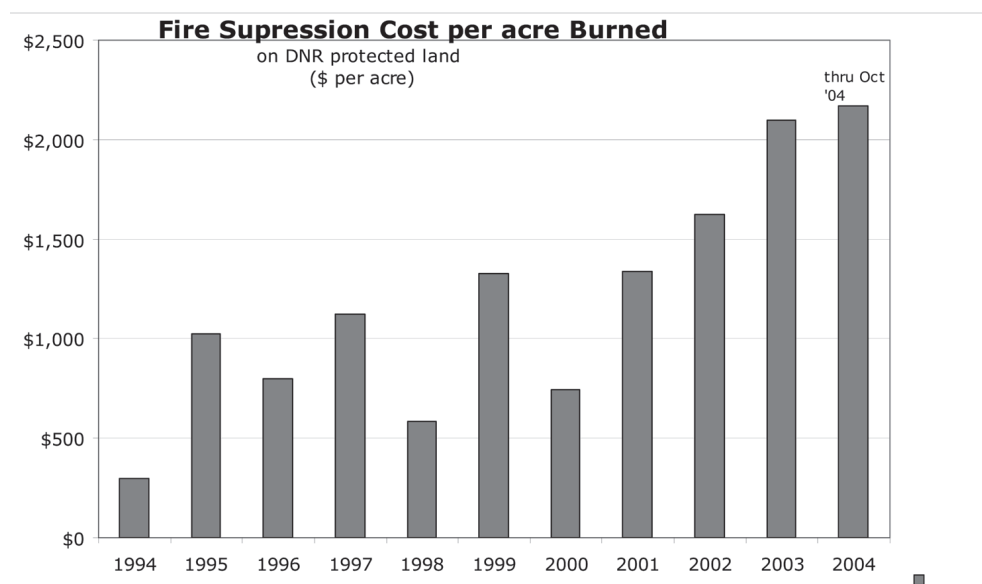
The cost of thinning treatments that would reduce the risk of fires represents an investment that would be expected to lower the cost of fighting fires over time. If other non-market values are considered, the benefits can be expected to exceed the investment in treatment costs very quickly. Even if just the avoidance of future firefighting costs is considered as a payback for the treatment cost there will likely be a positive benefit for treating high risk acres since the probability of preventing a fire by treatment increases year after year i.e. the treated acre would eventually have been in the path of a fire.

The cash flow or value benefit of avoiding firefighting costs and producing other non-market benefits is shown in Figure 4. The returns from the investment cost of thinning a high fire risk stand turns positive in as little as three to four years when many of the identified non-market benefits are included. When the cost of fighting fires is as high as \$2,000 per acre, the avoided costs of fighting fires results in a positive return in about 10 years. When a number of other non-market values are included the breakeven to a positive return is as short as three years. Considering non-market values in the fire treatment decision results in both a quick pay back to society with the magnitude of the payback rising to more than a \$1000 per acre in about 10 years.

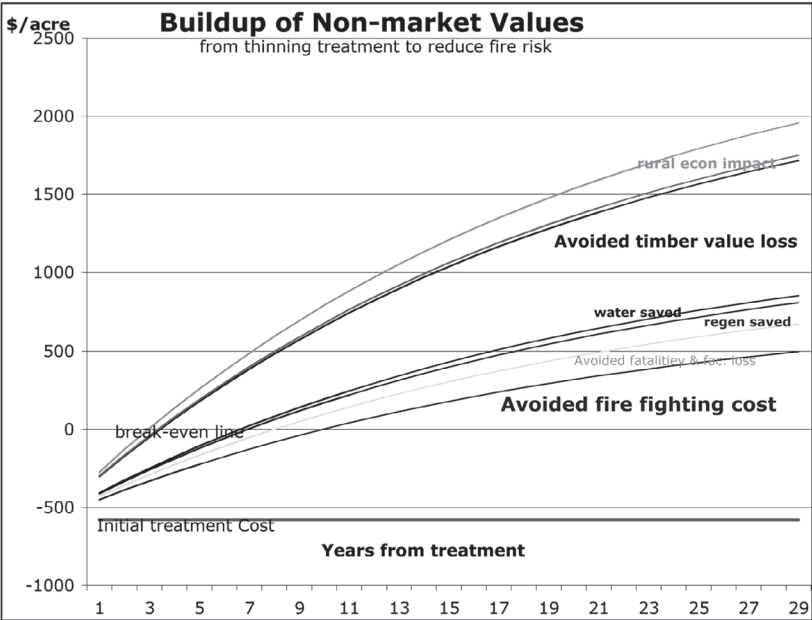
**Figure 1 — Fire Preparedness & Suppression Costs**





**Figure 2 — Fire Suppression Costs****Figure 3 — Okanogan/Wenatchee USFS Costs**

Okanogan-Wenatchee Fires 1990 – 2002			
Size Class	Suppression Costs	Total Acres Burned	Average Cost per Acre
A (0-.25 acres)	\$1,359,382	188	\$7,231
B (.26-9.9 acres)	\$4,769,332	948	\$5,031
C (10-99.9 acres)	\$8,484,542	2,662	\$3,187
D (100-299.9 acres)	\$6,736,500	3,379	\$1,994
E (300-2999.9 acres)	\$27,646,681	10,530	\$2,626
F (3000-4999.9 acres)	\$27,767,956	28,419	\$977
G (5000+ acres)	\$100,474,867	280,450	\$358





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# Appendix E

## Role of Contractors

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### **Role of Contractors: Summary of Initial Staff Analyses**

The purpose of Appendix E is to provide a summary of DNR's recent analyses of current and projected roles for contractors in wildfire suppression and preparedness. It provides a context within which DNR can develop a formal plan for the best use of contractors in its wildfire program.

The Role of Contractors Summary contains staff recommendations which are based upon best available information. One of the early tasks for the 2020 Wildland Fire Protection Strategic Plan Implementation Teams will be a review of these recommendations and all supportive data. This document only provides a summary of the analytical data.

The Pacific Northwest contractor business segment has expanded in recent years and is maturing. Under the auspices of the Pacific Northwest Wildfire Coordinating Group, substantial numbers of engines, water tenders and handcrews are readily available. Issues concerning contractor resource qualifications and performance are being addressed, and efforts are underway to implement an effective dispatch process based on "best value" criteria.

DNR's rationale for operating its own fire suppression resources is that it is cost-effective and allows complete control over pre-positioning or dispatching the correct type of resource where and when needed. In contracting language, this is akin to one of the major advantages associated with an "exclusive use" contract.

DNR is required by statute to annually make comparisons of cost between its wildland firefighting resources and those available from the private sector. DNR must utilize the resources that are most effective and efficient. The ability to draw valid cost comparisons between DNR and contractor resources is clouded by the fact

that DNR resources are “exclusive use,” while contractor rates are based on “call when needed.” A price premium is usually paid for exclusive use resources.

Despite this potential premium, unit costs for DNR’s resources are less than corresponding contractor rates in nearly all categories.

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## Staff Recommendations

In the context of the *“2020 Wildland Fire Protection Strategic Plan”*, the Staff Recommendations suggest appropriate roles for contractor resources; they specify a prospective new mix of resources that, over time, could be used by DNR to accomplish its wildland fire protection duties.

### Staff Recommendation 1

**DNR should adopt a “best value” definition and methodology based upon Pacific Northwest Wildfire Coordinating Group concepts.** DNR’s resource acquisition and use decisions should be based upon “best value” criteria and applied to DNR, other governmental agency and contractor resources. Currently, the DNR uses cost, availability and quality of service factors to serve as a surrogate; DNR also uses these three factors to meet the “most effective and efficient” test found in RCW 76.04.157.

In 2005, the Pacific Northwest Wildfire Coordinating Group adopted the following “best value” definition:

“The expected outcome of a process that allows for impartial and open competition, protecting both the integrity of the public contracting process and the competitive nature of public procurement. Meaningful competition may be obtained by evaluation of performance factors and other aspects of service and product quality, as well as pricing, in arriving at the greatest overall benefit to the Government”.

DNR should adopt a “best value” definition and methodology based upon Pacific Northwest Wildfire Coordinating Group concepts. We believe this approach makes sense and meets legislative direction. Resource acquisition decisions should be based upon “best value” criteria and applied to DNR, other governmental agency and contractor resources. The potential for an expanded role for the Washington Conservation Corps crew will be evaluated.

The following are expected outcomes that will result from the subsequent full and robust analysis to determine “best value:”

- **Initial Attack:** In general, DNR should continue to rely on the “closest forces” concept for initial attack resources. The guaranteed availability, control over deployment, and cost effectiveness are expected to make DNR-owned resources attractive in this phase of incident response.
- **Extended Attack and Large Incidents:** DNR should in many instances substitute contractor engines, tenders, handcrews and helicopters for corresponding DNR resources (inmate handcrews should generally not be replaced), so that DNR’s resources are free for initial attack duty.
- **Additional Resources During Demand Peaks:** DNR should draw on contractor resources to supplement its own during times when predicted or actual wildland fire response requirements exceed DNR’s internal capability.
- **Mop-Up:** DNR-supervised inmate handcrews and DNR initial attack engines and crews (working while available for immediate initial attack dispatch) are expected to be attractive in this phase of incident response.
- **Aerial Resources:**
  - **Large Airtankers and Large Helicopters:** DNR would continue to rely on cooperative agreements with other public agencies to obtain services of large fixed-wing aircraft and large helicopters. DNR supports the federal development of a new generation of heavy air tankers; such aircraft would replace the few remaining heavy tankers owned by contractors and operated under exclusive use contract with federal firefighting agencies.
  - **Medium Helicopters:** DNR would rely on its exclusive use medium helicopters for most initial attack needs in areas where contractor aircraft are not reliably available and ours are cost effective, and continue to utilize call-when-needed contractor helicopters for some extended attack and for most large incidents.

## Staff Recommendation 2

**DNR should institute an objective performance evaluation of all contractor, governmental agency or tribal resources used on incidents.**

- To obtain high quality performance based on continual improvement principles, DNR should ensure that it obtains objective performance feedback for all resources used on its incidents.

### Staff Recommendation 3

**DNR should adopt methodology to determine its indirect expenses for the purpose of comparing DNR-owned resource unit costs to those of contractors.**

- **Cost of Contractor Resources:** Many hold a perception that contractor resources are much more expensive than agency resources, although a general lack of valid comparisons continues to cloud this issue. DNR's costs exclude indirect agency expenses<sup>1</sup>, whereas contractors' rates include all costs.
- DNR resources are available to DNR on an exclusive use basis - for which a premium is normally paid - whereas contractors' rates are on a less-expensive call-when needed basis.
- DNR's rates for its own equipment have historically not included indirect costs. In part, this is because Pacific Northwest Wildfire Coordinating Group members have agreed to charge only for direct expenses when seeking reimbursement from other member agencies.<sup>2</sup>

### Staff Recommendation 4

**DNR should seek to maximize the use of DNR-supervised inmate handcrews to perform labor-intensive mop-up duties because of the markedly lower unit cost compared to other sources of handcrews.**

### Staff Recommendation 5

**DNR should evaluate the potential to temporarily relocate appropriate numbers of DNR-supervised inmate handcrews from Westside camps to the Eastside for initial attack duties during critical phases of the fire season.**

- DNR maintains 48 ten-person inmate crews through a cooperative arrangement with the state Department of Corrections (and Department of Social and Health Services for 3-4 juvenile inmate crews).
- For reasons other than wildfire response, all but five inmate crews are based in Westside Regions.

<sup>1</sup> DNR's comparative costs include only those that DNR would charge another cooperating agency for use of the DNR resource.

<sup>2</sup> Under Article 45.A.4 Suppression Billings of the 2004 Master Cooperative Fire Protection Agreement signed by DNR, Oregon Department of Forestry, and the five federal wildland firefighting agencies, the parties agree not to include indirect expenses when seeking reimbursement for fire suppression expenses.

- Fire costs and damages are strongly correlated to size. About three-quarters of fires larger than 10 acres occur in the two Eastside Regions (44% in Northeast and 29% in Southeast), and trends in both Regions are increasing. In contrast, only 26% of these wildfires (an average of 11/year) occur in the combined four Westside Regions that show a downward trend.

## **Staff Recommendation 6**

**Consistent with application of the “closest forces” concept, DNR should continue to operate its own resources for initial attack. It is cost-efficient, and the guaranteed availability and control over deployment makes it more efficient than obtaining similar resources from contractors.**

- While less than 1% of wildfires grow larger than 100 acres, such fires cost millions of dollars and have accounted for nearly three-quarters of DNR’s total fire suppression expenses.
- DNR has historically sought to control wildfires when small in order to be safe, minimize loss of natural resources, and minimize suppression expenses.
  - DNR’s direct control over availability and deployment of its resources significantly contributes to initial attack success.
  - When dispatch times are improved, initial attack forces arrive sooner when the fires are smaller. The tactical and other operational advantages associated with DNR-owned resources likely result in reduced fire size due to response time advantages.
- DNR should continue to focus on maintaining adequate numbers of initial attack fire suppression resources - including Type 5 and Type 6 engines, Type 2 helicopters and agency handcrews (handcrews and helitack).

## **Staff Recommendation 7**

**Use only DNR and other governmental employees to supervise other DNR or governmental employees until four key issues are satisfactorily addressed with our partner agencies.**

- **Contractor qualification:** Ensuring contractors ICS qualifications are current, meeting the requirements for ICS positions held at the time of retirement or separation from their former employing agency.
- **Policy conflicts:** Policies of some Pacific Northwest Wildfire Coordinating Group partner agencies that preclude supervision of agency employees by contractors.

- **Displacement of agency employees:** A fear that agencies may rely upon retirees and contractors to meet needs without considering successional planning issues.
- **Acceptance of risk:** Legal liabilities and responsibilities of the contractor for their actions versus the legal, operational and political liabilities that fall upon the agency.

## Staff Recommendation 8

**Greater use of contractors. On extended attack and large incidents, DNR should in many instances substitute contractor engines, tenders, handcrews and helicopters for corresponding DNR resources (inmate handcrews should generally not be replaced), so that DNR's resources can be reallocated for initial attack duties.**

- Substitution will free the DNR resources for critical initial attack deployment elsewhere although actual direct costs of an incident may be higher as a result.
- The marginal costs added on the small number of large fires will be offset by avoiding costs on other wildfires brought under control at less cost due to greater initial attack successes.

## Staff Recommendation 9

**DNR should explore alternative staffing and response models.**

- One model might rely upon a smaller DNR base firefighting resource core supplemented by contractor resources during predicted periods of high response needs. For DNR to adopt such an alternative, it should:
  - provide a comparable level of effectiveness;
  - be more cost efficient;
  - optimize initial attack capabilities; and
  - provide adequate numbers of fully trained and qualified overhead personnel on a sustainable basis.
- As a starting point, DNR should evaluate how to best use predictive products offered by the Northwest Wildfire Coordinating Group's Predictive Services Group. The model uses data derived from the National Fire Danger Rating System, including weather information collected from the Remote Automated Weather System.



## **Staff Recommendation 10**

### **Greater use of contract training.**

- DNR should take advantage of the expanding availability of qualified contractors to deliver incident command system and national incident management system training to DNR employees.





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# Appendix F

## Successional Planning

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### **Successional Planning: Summary of Initial Staff Analyses**

The purpose of Appendix F is to provide a summary of DNR's recent analyses of current and projected demand for DNR personnel to serve as "overhead" in managing wildfires or other incidents such as disaster relief. It provides a context within which DNR can develop a formal succession plan for its wildfire program personnel.

The Successional Planning Summary contains staff recommendations which are based upon best available information. One of the early tasks for the 2020 Wildland Fire Protection Strategic Plan Implementation Teams will be a review of these recommendations and all supportive data. This document only provides a summary of the analytical data.

Successional planning is designed to be a guide for DNR policy-makers and managers to take deliberate and targeted actions. The objectives are to provide and sustain appropriate numbers of people in specific incident command system positions.

Pertinent conclusions drawn from the following document include:

**Trends in wildfire:** Data from 1995-2005 indicate a general downward trend in the occurrence of wildfires of all sizes on DNR-protected lands west of the Cascade Mountains. In contrast, the trend is upward in areas to the east. Perhaps of greatest significance, there are increasing trends for both Northeast and Southeast Regions in terms of number of wildfires that grow larger than 10 acres in size and, among these, those that grow larger than 100 acres in size.

**Some key position needs are being met but there are critical shortages:** The numbers of Type 3 and Type 2 incident management organizations supported by the DNR define the adequacy or deficiency by position. Based on analyses and staff recommenda-

tions included in this document, DNR's needs for some key incident command system positions are being met. However, significant shortages are identified among other key positions, including initial attack overhead (Type 4 incident commander) and for maintaining the current level of participation on Washington Type 2 incident management teams.

**Financial investments in people:** There are significant fiscal implications associated with the number of DNR people required in specific incident command system positions. More than 10 years of elapsed time and investment of at least \$65,000 is required before an individual is typically qualified in key incident command system positions.

**Type 2 and Type 1 incidents cause disproportional impacts:** Only about 5 incidents/year account for three-quarters of DNR's annual fire suppression expenses. These are the large, complex fires managed by Type 2 or Type 1 incident management teams.

Type 2 and Type 1 fires draw a large proportion of DNR's most experienced fire suppression personnel, and do so for extended periods during the busiest portion of fire season (roughly June 16-October 15). Such fires exert a disproportionate impact on direct costs and opportunity<sup>1</sup> costs for both DNR's routine agency program functions and fire programs.

**Equitable participation and pooling:** Because most large, complex incidents in Washington are multi-jurisdictional in nature, there is a sound rationale for equitable participation and pooling of available overhead resources; to be fair, all partners from different jurisdictional agencies need to equitably support the full gamut of incident command system positions if we are to meet the needs of all.

**"All-Risk Incidents":** What affects might come from Washington interagency Type 2 team involvement with "All-Risk" incidents?

**RCW 38.52.110(1)** requires DNR to respond to any type of emergency if requested by the Governor (e.g., through the State Military Department) or other executive heads of state political subdivision emergency management organizations (e.g., at the county level).

At present, it is impossible to accurately forecast the potential demand for all-risk responses. Uncertainties abound and include:

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<sup>1</sup> Most fire program participants have "normal" agency jobs other than fire.

- At what time of the year might these orders come (will they essentially extend the “peak demand period” to include times when DNR team members have not previously been called to respond)?
- What frequency of response demand is likely and how long might the assignments last?
- What training and certification standards will be required of team members, and how will this affect the quantity and timing of training for DNR participants?

Prior to 2005, there were no orders for Washington interagency Type 2 teams to respond to all-risk incidents. But in autumn of that year, three Washington interagency Type 2 teams did respond to orders for hurricane response duty in the U.S. Gulf States. Exclusive of travel and rest and recuperation, the teams were on assignment for a total of 59 days during September and October.

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## **Staff Recommendations**

### **Staff Recommendation 1**

**Understand the impact of cultural change.**

The Staff Recommendations would significantly affect DNR’s “fire culture;” it can be expected to induce a high degree of anxiety and stress throughout the agency and for almost all of DNR’s existing partner agencies and cooperators.

### **Staff Recommendation 2**

**Risk tolerance.**

Allocate resources to those incidents or where there is high potential to threaten lives, damage natural resources or damage developed property. DNR is committed to achieving a high level of initial attack success, yet accepts that 5-7% of wildfires per year will escape initial attack and grow to greater than 10 acres including Type 3 or Type 2/1 complexity.

### **Staff Recommendation 3**

**Develop a narrowly focused successional plan.**

A narrowly focused successional plan is essential for DNR’s sustained success. The expense and time required to qualify, coupled with DNR’s need for relatively few yet critical individuals at the

Type 2 and Type 3 complexity level requires a plan that will ensure adequate staffing. The plan would identify individual DNR employees, providing them both the opportunity and support to advance in the fire program.

- DNR personnel who choose to pursue advanced incident command system overhead qualifications would need to recognize the extended nature of their and the DNR's commitment to remain active in these targeted positions; this would be true unless there are extraordinary personal circumstances.
- In general, DNR should:
  - i. Determine specific target numbers of people to be qualified on a sustained basis in specific incident command system positions by geographic Region;
  - ii. Develop targeted recruitment and retention plans for individual employees; and,
  - iii. Focus allocation of training/on-job-experience opportunities for those individuals with most promise to fill prioritized incident command system position.

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## **Initial Attack (Type 4 and Type 5 incidents)**

### **Staff Recommendation 4**

**Assess current DNR resource allocation and consider augmenting Eastside Regions initial attack resources.**

Additional Eastside initial attack capability is justified by the wildfire incidence trends; this is further supported by the state's demographic projections. DNR should consider increasing its Eastside initial attack capability. How to best position resources will need additional study. Any management decision would be made based on best available information, recognizing employee impacts and the need for appropriate transition plans.

### **Staff Recommendation 5**

**Maintain initial attack success through helicopter pre-positioning.**

DNR-operated helicopters are an important initial attack tool, particularly in the Eastside Regions for wildfire starting in remote areas and others where they are more effective than traditional ground-based initial attack.

## **Staff Recommendation 6**

### **Develop more Type 4 incident commanders.**

DNR should place a priority on increasing its numbers of Type 4 incident commanders, particularly in the Eastside Regions.

## **Staff Recommendation 7**

### **Solve key Type 4 incident commander retention issues.**

DNR needs to develop and implement a plan to resolve the retention issue. DNR's initial attack incident commanders (Type 4 incident commander) should mostly be its engine leaders and helicopter managers. Yet these are typically seasonal, non-permanent positions, and there are significant disincentives for retaining employees with DNR for the six years (and \$40,000 of training) required to become qualified in this capacity.

## **Staff Recommendation 8**

### **Ensure high quality “entry level” experience to maintain safety.**

DNR needs to develop and implement innovative practices to ensure that we maintain our impeccable safety record and sustain adequate numbers of well-qualified personnel. Currently, there is relative scarcity of on-the-job opportunities from which to gain practical experience in “entry level” incident command system positions.

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## **Extended Attack (Type 3 incidents)**

## **Staff Recommendation 9**

### **Type 3 Organizations.**

- Initial analyses indicate that DNR's highest priority should be with Northeast and Southeast Regions. DNR should continue to apply the “mini-team” concept in those two Regions, bolstered by deliberate reliance upon pooled capacity derived from outside of the individual Region.
- DNR should implement a flexible readiness and response plan to shift resources based changes in actual and predicted fire danger.

## **Staff Recommendation 10**

### **Explicit rationale for pre-positioning.**

Pre-positioning Type 3 Organizations and other resources should be based on state-of-the-art fire weather forecasts and other intelligence information.

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## **Large, Complex Incidents (Type 2 and Type 1 incidents)**

## **Staff Recommendation 11**

### **DNR's participation on interagency Type 2 incident management teams should be proportionate to use and benefit.**

DNR should continue to participate on teams comprised of federal, DNR and local agency personnel.

- DNR presently provides about 50% of the personnel needed to staff five 50-person Type 2 incident management teams. Yet use of these teams over the past six years for DNR-majority incidents amounted to only 26% of the total demand.
- Preliminary data suggests that DNR could rely upon fewer teams overall at an acceptable, but higher, level of risk.
- DNR should proportionately reduce its participation on the interagency Type 2 incident management teams to reflect DNR's use, or find equitable financial arrangements to continue DNR's level of participation.
- DNR should evaluate the number of Washington Type 2 incident management teams. Currently, there are five interagency Type 2 teams.
  - i. Four or fewer teams were sufficient to meet simultaneous deployment demands of all agencies 98% of the time over the past five years.
  - ii. However, 99% of the time, DNR-majority incidents required two or fewer teams.
  - iii. If there were 4 Type 2 teams, then 45-55 of DNR's most senior and experienced personnel would be free to serve in other fire program management or carrying out "normal" agency duties.



- If additional analyses (followed by consultation with our employees and wildfire protection partners) indicate a reduced number of Type 2 teams, then well-crafted transition and communication plans are essential.

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## KEY ASSUMPTIONS

A number of simplifying assumptions were made to conduct this analysis. DNR's strategic planning effort has potential to change one or more of these; if so, the conclusions summarized in the previous section should be reconsidered and adjusted to the extent required.

1. DNR continues to have legal jurisdiction for 12.7 million acres, configured as in 2005.
2. DNR continues to adhere to PMS 310-1 qualification standards for its personnel.
3. Other than anticipated changes with local fire protection district agencies, DNR has the same level of reliance on cooperating agencies and contractors as in 2005.
  - a. Where strategically advantageous, DNR uses authority under RCW 76.04.165 to negotiate with appropriate fire protection districts (including municipal fire departments) and transfer existing legal wildfire protection responsibility from DNR to those fire protection districts; in other areas, DNR uses inter-governmental agreements to secure initial attack response from capable fire protection districts (while retaining legal responsibility).
4. DNR personnel do not become substantially more involved with non-wildfire incidents and associated training (e.g., "all risk" incidents).
5. DNR's fundamental organizational structure is unchanged - a small number of employees work year-round in the fire program, and most of the fire suppression overhead personnel have regular jobs outside of the fire program and participate voluntarily on an as-needed basis.
6. DNR relies on its own personnel - and mostly Regional personnel - to staff its Type 3 organizations, because of the need to have geographically based rapid and guaranteed response capability.
7. DNR continues to participate in interagency Type 2 incident management teams.
8. DNR's fire training budget remains constant.





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# Appendix G

## Forest Health & Wildfires, a Net Cost Approach to a True Wildfire Protection Program

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### **A Paying Proposition for the Public, Taxpayers and Landowners**

There are a number of views about forest health and the role of wildfire. Many have argued that the nation's forests should be restored to pre-European conditions. With such a view, all management or regulatory strategies are evaluated for their ability to return to the past.

However, it is not socially or ecologically possible to restore forests and other landscapes in Washington to the condition they were in prior to European settlement. Past evolutionary processes still have modern-day implications, but things have changed—including the climate and the impact of people and their values. These interactions guarantee that the future will be substantially different than the past and a return to the historical situation simply is not feasible.

Adaptive strategies, not restoration, are the best pathways to improve current forest conditions. Adaptation acknowledges fundamental ecological process in a context that has changed and will continue to change. Such an approach to wildfire protection and forest health is more likely to succeed because adaptation reduces both risks and costs to the public, communities and landowners.

If avoided costs and who “really pays” are considered, then total net costs to taxpayers, the public and landowners can be reduced while forest health is improved and risk is reduced. Certain investments in forest health and fuels management can make forests safer, both today and tomorrow.

The key to effective and efficient action is in understanding the dynamic links between forest health risks and wildfire risks.

*"Risk is a concept used to give meaning to things, forces, or circumstances that pose danger to people and what they value. Descriptions of risk are typically stated in terms of the likelihood of harm or loss from a hazard and usually include:*

- *an identification of what is "at risk" and may be harmed or lost (e.g., health of human beings or an ecosystem, personal property, quality of life, ability to carry on an economic activity);*
- *the hazard that may occasion this loss; and*
- *a judgment about the likelihood that harm will occur."*<sup>1</sup>

## Risk<sup>1</sup>

We are now observing increased risk to public and firefighter safety and increased risk both to natural resources and improved property. While there are risks to traditional market values, such as timber or homes, there are also substantial risks to non-market values such as habitat, water quality, and recreational opportunities.

Risks are formed and shaped by different components. In the forest environment, risk components occur in three broad categories. For any given location, the specific mix of these risk components creates not only different risks and levels of risk, but also different opportunities to improve or stabilize forest health while reducing the likelihood of catastrophic wildfire.

- **Ecological category** — This includes the type and nature of the forests that are adapted to a particular location; soil characteristics; natural fire regimes; disturbance agents such as insects and pathogens; and long-term climate effects that influence forest and soil development.
- **Climate Change category** — This includes newer patterns of precipitation and temperature.
- **Social category** — This includes the impact of past, present and future land-use patterns, such as conversion to non-forest use; forest management activities which have changed forest conditions; public safety commitments; investments in wildfire risk reduction; investments in forest health; recreational-use intensity; and the number<sup>2</sup> of fires started by humans.

Eastern Washington continues to experience significant forest health problems that have increased many types of risk. Insect outbreaks cost forest owners millions of dollars through growth loss and tree death every year, and increase wildfire danger. Both the magnitude and extent of some forest pathogens (agents of disease) are greater than historical levels, with a correspondingly larger impact on the forests and other resources that people value.

<sup>1</sup> "Colloquium on Sustainable Forest Management", Dr. Jay O'Laughlin, Director, Idaho Forest, Wildlife and Range Policy Analysis Group, College of Natural Resources, University of Idaho: March 15, 2004 presentation to the USDA Forest Service in Washington D.C.

<sup>2</sup> About 85 percent of all fires on DNR-protected lands are human-caused.

Extreme fire behavior has become more common. In 2005, the School Fire in southeast Washington burned 52 thousand acres, 109 residences and 106 outbuildings. Suppression costs for this one fire was \$15 million. Not all fire losses are economic. In 2001, the Thirty-Mile fire in Okanogan County killed four firefighters when the fire surged up a canyon.

Although the increased forest health and wildfire risks are greatest in eastern Washington, there are also many areas west of the Cascade Range where risk continues to increase.

The ability to respond to the risks associated with deteriorating forest health on extensive acres across many ownerships is a serious policy challenge. The complexity of both the problems and solutions is due to a series of significant issues that include the following:

- **Spatial Scale** — Millions of acres in Washington are involved. Many solutions need to be applied at landscape scales or at a size that is often beyond a single owner.
- **Time** — Given the large spatial scale, a significant amount of time is needed to improve forest health, even if all parties are motivated.
- **Costs** — Changing forest conditions to improve forest health takes money, but money is not always available.

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## The Fire/Forest Health Relationship

Forest health and fire are closely connected to the ecology of Washington's forests. The role that fire plays in healthy forests is becoming more clearly understood.

A forest's ability to withstand stresses such as drought, fire, insects and diseases is directly affected by complex interactions of many factors that relate to three basic tree growth concepts:

1. **Trees growing in suitable climates and soils will increase in size and number until one or more factors necessary for growth are no longer available.** As trees compete for physical resources such as access to sunlight, water, and mineral nutrients, these resources become increasingly "scarce"—the demand outstrips the supply. This "scarcity" limits tree growth, reducing or stopping it altogether.

2. **Lack of ability to grow is associated with susceptibility to insects and diseases.** Affected trees may have insufficient water or energy to produce and circulate defensive chemicals or repair injured tissue. Insects and pathogens take advantage of weakened, crowded host trees.
3. **Unless some event such as drought, fire, or timber harvest occurs and kills or removes some of the competing trees, trees grow until they become weak and susceptible to insects and disease.** In some cases, the insect and disease mortality is sufficient to reduce resource scarcity, relieving stress on surviving trees. If insect and pathogen populations rise to high enough levels, even trees that would normally survive environmental stress may die.

Within these concepts, biological (e.g., trees, insects, pathogens) and non-biological factors (e.g., soil, weather, moisture, and nutrients) interact. The result is a mosaic of forest types and forest conditions with differing tree species, density, tree vigor, and fuel loads.

Disturbances are the events, predictable or unpredictable, that change how trees grow. They can kill some trees and/or change how a forest develops over time. Disturbance is common to all forests (and other ecosystems), and may be large or small, frequent or infrequent. Disturbance regimes—the pattern of disturbances that occur over time—modify the rate and magnitude of tree competition and fuel build-up and depletion in a forest.

Fire is an important forest disturbance in both eastern and western Washington. Fire may injure and kill trees, but it also releases growing space and nutrients to surviving trees. Fire dramatically affects the fuels available for future fire and the arrangement of those fuels. It removes woody materials on the ground much faster than they decompose. The patterns of these changes are part of the natural fire regimes, the fire re-occurrence cycles found on the historical landscapes.

For example, in much of eastern Washington, where summer heat regularly dries grasses and fuels, frequent fire naturally removed trees before tree growing space and resources became seriously depleted. Historically, insects and diseases rarely were able to cause serious damage to vigorous, growing (host) trees. Moreover, fuels were consumed regularly, preventing severe wildfire temperatures and extreme fire behavior.

In contrast, at wetter sites in western Washington and at high elevations, weather conditions that allow thorough fuel drying, ignition, and burning do not occur every year. On such sites, tree

growth, including the addition of new trees, proceeds until resources (e.g., nutrients, water) are depleted and insect and disease activity rises. Fuels, such as dead trees, accumulate over time.

When an unusually dry weather pattern occurs in a place where fuel levels are high, a fire can burn severely, removing most or all of the dead fuel and living trees in a major conflagration. In particular, small trees provide “ladder fuels” that allow fires to move from the ground into the upper portion (crown) of the forest, resulting in “crown fires.” Crown fires are the most destructive of all fire types, usually resulting in the death of most of the trees, a stand-replacement event. Crown fires are characterized by very high temperatures and rapid release of energy that exceed millions of BTU’s per hour that may significantly damage soils and water quality.

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## Current Conditions

Washington’s historical disturbance regimes have been modified by settlement-era grazing, modern fire suppression, and other land and forest management activities. The exclusion of fires, in particular the low intensity fires that were once common, has accelerated the build up of fuels. Early grazing removed the grasses, forbs, and low vegetation that once carried fires through the forests.

Coupled with the exclusion of fire and reduction of fine fuels, certain types of timber harvest practices have dramatically shifted the composition of the forest in many locations. The new tree species mixes are often not well-suited to the ground they occupy, and the shift in species is often accompanied by an increase in the number of trees per acre. The larger number of trees competing for a fixed amount of water, nutrients, light and other resources, creates scarcity. The natural result is low tree vigor and increased vulnerability to insects and pathogens, which substantially increases the risk of poor forest health.

In many locations, forests are growing more wood than is being harvested. Coupled with overstocking and other disturbance factors, the result is that a significant volume of wood is lost to tree mortality (death). When the mortality rate is faster than the decomposition rate, the dead wood adds to fuel loading and the risk of catastrophic fire.

### Figure 1. Mortality/growth rate<sup>3</sup> on U.S. timberlands by ownership classification and region, 1953-2002.

**Note:** Washington is located in both the Pacific Coast and Interior West Regions.

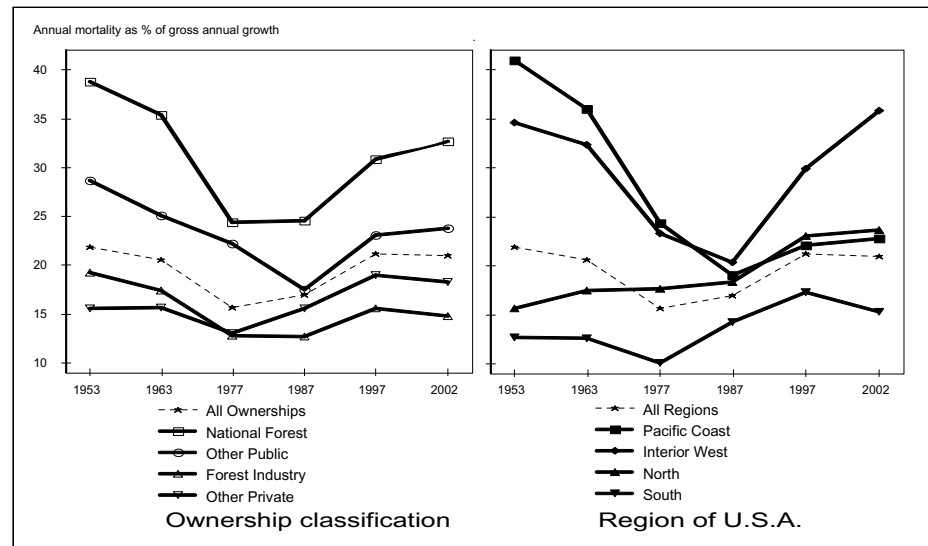


Figure 1 shows how more of the nation's forest total growth is now contributing to fuel loading. For all U.S. National Forests, the annual mortality is currently over 30% of annual growth. So, if an amount of new wood that's equal to 100 new trees grows each year, an amount of wood equal to more than 30 trees dies. In the Interior West (which includes eastern Washington) the annual mortality is currently more than 35% of the annual growth. These are dramatic increases in mortality rates above those in the 1970's and 1980's. Consequently, there is a huge annual addition of new fuel volume to the nation's forests. The results are greater risks and increased extreme fire behavior.

## Adapting to Improve Forest Health

Forest conditions have changed considerably in the past 150 years, but they never were truly static. The system itself is dynamic. Ecosystems respond to biological, environmental and social forces. Today, climate change, shifts in the composition of the forests and macro-economic forces all collide to produce an unstable system that is undergoing rapid change.

<sup>3</sup> "Inventory-based Forest Health Indicators," J. O'Laughlin and P. Cook, March 2003, Journal of Forestry, Vol. 101, Number 2.



We are experiencing increased risks and accelerating costs. Yet, we know enough to adopt necessary adaptive practices that will stabilize or improve current conditions and reduce the risk to acceptable levels. Solutions are a direct response to an identified risk, and possible solutions can be grouped by risk components: ecological, climate change and social.

## **Ecological**

- Acknowledging the evolutionary environment in the context of changed conditions that exists between a tree, the ground it grows on, and various natural and introduced disturbance agents;
- Acknowledging that humans play a major environmental role and have a role as stewards;
- Avoiding unnatural and catastrophic disturbances;
- Protecting rare or vulnerable habitats; and
- Protecting legacy features from destruction by unnatural disturbances.

## **Climate Change**

- Managing forests so that the right number of trees and the right tree species are present so that moisture and temperature extremes or changing trends do not unacceptably increase vulnerability to insects and pathogens.

## **Social**

- Avoiding threats to human life, public safety and resources;
- Avoiding expensive fire suppression;
- Avoiding expensive restoration treatments on sites degraded by intense fires;
- Supporting forest management actions that appropriately reduce fuel loading and/or restore or mimic natural disturbances;
- Working with planning efforts to promote forest health, fire-safe neighborhoods and protection of the working forests.

These are solutions that work. These are solutions that are based on sound principles of adaptive management.

In 2004, as directed by the Washington State Legislature, Commissioner of Public Lands Doug Sutherland assembled a Forest Health Strategy Work Group (Work Group). The Work Group was asked to examine extensive forest health problems in Washington's forests and to identify opportunities to improve forest health conditions.

The Work Group was composed of landowners, land managers, consulting foresters, a hydrologist, a forest entomologist, a fire ecologist, tribal government, conservation groups, Society of American Foresters, Washington Department of Fish and Wildlife, the University of Washington's College of Forest Resources, USDA Forest Service, and the Department of Natural Resources. In December 2004, the Work Group issued a report, "*A Desirable Forest Health Program for Washington's Forests*"<sup>4</sup>.

The Work Group created ten Findings and Recommendations, ranging from developing forest health risk thresholds to coordinating regulatory programs. Beyond the specific Findings and Recommendations, the Work Group asserted the following key principles and facts:

- "... Achieving satisfactory forest health outcomes is a shared responsibility between landowners and the public." (page 4)
- "...the keystone to achieving forest health across all ownerships in Washington is that well managed forests are healthy forests." (page 6)
- "Recognition that appropriate funding/investment today will avoid increased costs in the future while at the same time providing many non-market benefits to society." (page 6)
- "Fire suppression costs are rising due to extreme fire behavior caused by high fuel loads and increased tactical complexities when homes and structures are intermixed with forest. ... Fire prevention continues to be a very important component of an overall strategy, but activities that promote forest health by reducing tree crowding and fuel loads will provide long-term benefits by altering the trend." (page 8)
- "Fire ecology is the key to restoring proper forest health. Forests managed for resistance to fire damage will also resist damage by native insects, disease organisms, and extreme weather conditions with the additional advantage of protecting fish, wildlife, watershed, and other public resources." (page 14)

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## Paying for the Work

Assuming that regulations or policies permit the harvest of marketable trees, harvest revenues can fund a number of practices that will improve forest health. Active forest management can reduce fuel loading, favorably influence species composition, and restore

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<sup>4</sup> To view the complete report, go to:  
<http://www.dnr.wa.gov/htdocs/rp/forhealth/fhswgc/index.html>.

stocking levels to a healthy range. Forest health can be improved simply by reducing stocking and using reforestation practices to create conditions that resemble those under which the trees and pests evolved.

However, timber revenue or other traditional sources of revenue is not always available. The availability is in part a reflection of a landowner's or land manager's choices and a reflection of the market value of timber.

Long-term timber prices have shown a generally rising trend since the early 1900's. However, the international markets, supply/demand relationships and technological changes appear to have changed the historical trend. Some argue that the change is permanent. At least in the near-term, if not longer, the real price of timber will decline. This decline in real price reduces the amount of discretionary money available to invest in forest health.

There are also millions of acres where existing forest stand conditions do not or will not ever grow trees that will cover the costs of harvest and hauling the logs to market. The small diameter logs that should be removed have little or no market value, or the removal costs exceed potential product price. In such conditions, there is a net cost for thinning or other operations that will materially lower fire risks and improve forest health.

Traditional market-value calculations will show that forest health operations in such stands are imprudent for the landowner, a bad investment that may "never pay for itself." This is the dilemma that seems impossible to resolve without considering non-market values or avoided costs. Non-market values and avoided costs include:

- Community value of fire risk reduction;
- Increased water yield;
- Regional (direct & indirect) economic benefits;
- Firefighting costs avoided;
- Fatalities avoided;
- Facility losses avoided;
- Timber losses avoided;
- Regeneration and rehabilitation costs avoided; and
- Fish and wildlife habitat losses avoided.

The University of Washington's College of Forest Resources evaluated both market and non-market values<sup>5</sup>, assessing the implications of investments that both reduced wildfire risk and improved forest health. The researchers found that there were substantial savings to the taxpayers and the public associated with projects that reduce fuels. They found that high-risk stands showed a net benefit of almost \$2,000 per acre, and medium risk stands showed about half that value. This means benefits exceed costs by nearly \$1,000- \$2,000 per acre. This is how much additional money could be spent to improve forest health before the costs of treatment exceed the benefits of the treatment. The authors<sup>6</sup> note that the "while the values assigned to the benefits from fuels reductions...can rightly be considered coarse estimates, they have been shown to be legitimately defensible and intentionally conservative."

Additional benefits from fuels reductions—such as habitat restoration, water quality protection, carbon credits, and others—are more difficult to estimate but are of high public value. Adding these benefits to the calculation increases the net value of investing in fuels reduction that also reduces wildfire risk. Further research is needed to quantify such benefits.

Though the value of the benefits of such projects clearly can exceed the costs, there is still the real problem of generating enough money to pay for such projects. Moreover, there are many different beneficiaries, further complicating the issue of *who* should pay:

- The landowner benefits if a forest is healthier and there is less wildfire damage to their property.
- The public benefits due to reducing catastrophic wildfire impacts on water quality and wildlife habitat (including habitat associated with threatened and endangered species) and due to reducing wildfire suppression costs, which will only continue to increase unless some things change.

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<sup>5</sup> The summary of the research appears in the DNR's December 2004 report, "A Desirable Forest Health Program for Washington's Forests", Appendices 4 & 5 at <http://www.dnr.wa.gov/htdocs/rp/forhealth/fhswgc/foresthealthreport.pdf>. To view the complete report "Investigation of Alternative Strategies for Design, Layout, and Administration of Fuel Removal Projects", College of Forest Resources, Rural Technology Initiative, University of Washington, July 2003, go to [www.ruraltech.org](http://www.ruraltech.org).

<sup>6</sup> Ibid.

Still, recognizing avoided costs and who “really pays” suggest that certain investments in forest health and fuels management can make forests safer, both today and tomorrow. Creating a true wild-fire protection program that better protects people and what they value requires understanding the various types of risk and the different parties that are at risk. A net cost framework provides a starting point to evaluate different solutions to create both healthy forests and safe communities.



SUBSTITUTE SENATE BILL 6603

State of Washington 59th Legislature 2006 Regular Session

By Senate Committee on Natural Resources, Ocean & Recreation  
(originally sponsored by Senators Doumit, Morton and Parlette)

READ FIRST TIME 02/02/06.

1 AN ACT Relating to wildfire prevention and protection; creating new  
2 sections; making an appropriation; and providing an expiration date.

3 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

4 NEW SECTION. **Sec. 1.** The wildfire prevention and protection work  
5 group is established. The work group consists of the following  
6 members:

7 (1) Two members representing counties that contain significant  
8 forest land, grazing land, or both, at least one each from eastern and  
9 western Washington, selected by the Washington state association of  
10 counties;

11 (2) A member representing a city that contains significant forest  
12 land, grazing land, or both, selected by the association of Washington  
13 cities;

14 (3) Three members representing fire districts that contain  
15 significant forest land, grazing land, or both, at least one each from  
16 eastern and western Washington, selected by the state fire  
17 commissioners association;

18 (4) Two members representing environmental protection

1 organizations, selected by the executive director of the Washington  
2 state conservation commission;  
3 (5) A member representing industrial forest landowners, selected by  
4 the Washington forest protection association;  
5 (6) A member representing small forest landowners, selected by the  
6 Washington farm forestry association;  
7 (7) A member representing the building industry, selected by the  
8 building industry association of Washington;  
9 (8) A member representing realtors, selected by the Washington  
10 association of realtors;  
11 (9) One representative of agriculture selected by the Washington  
12 farm bureau;  
13 (10) One contract logger selected by the contract loggers  
14 association;  
15 (11) One person selected by the Washington cattlemens association;  
16 (12) One person from the Washington state patrol's fire protection  
17 program;  
18 (13) Two forest landowners with large forest lands, one from east  
19 of the crest of the Cascade mountains and one from west of the crest of  
20 the Cascade mountains;  
21 (14) The insurance commissioner, or the commissioner's designee;  
22 (15) A member representing the Washington state building code  
23 council, selected by the chair of the council; and  
24 (16) The commissioner of public lands, or the commissioner's  
25 designee.

26 NEW SECTION. Sec. 2. (1) The wildfire prevention and protection  
27 work group shall review existing fire studies conducted by or for the  
28 department of natural resources, the joint legislative audit and review  
29 committee, and other organizations. The work group shall review the  
30 following issues:  
31 (a) Whether the forest fire protection assessment rate provides  
32 sufficient funding towards the protection of public and private lands  
33 from wildfires;  
34 (b) Whether the statutory limitations on the purposes for which  
35 moneys collected through the forest fire protection assessment and from  
36 the landowner contingency forest fire suppression account may be  
37 expended are warranted;



SSB 6603 p. 2 1 (c) Whether the term "forest land," as set forth in  
RCW 76.04.005, 2 properly defines the scope of land on which the  
forest fire protection 3 assessment should be assessed; 4 (d) Whether  
forest fire protection assessments are currently being 5 collected  
from all lands on which the department of natural resources 6 has the  
duty to impose such assessments; 7 (e) Whether the adoption of  
elements from wildfire programs of 8 other western states would  
improve wildfire protection and suppression 9 in Washington state;  
10 (f) Whether the department of natural resources' authority to 11 protect  
forest land should include the authority to protect structures; 12 (g)  
Whether improvements and efficiencies in the department of 13 natural  
resources' fire protection activities would impact fire 14 suppression  
activities and expenses; 15 (h) Whether state and local building codes  
adequately address the 16 dangers posed by development in areas subject to  
wildfires; 17 (i) Whether local government land use regulations, and state  
18 advisory and assistance programs, adequately address the dangers posed  
19 by development in areas subject to wildfires; and 20 (j) Whether  
insurance rates in Washington state reflect the dangers 21 posed by  
development in areas subject to wildfires. 22 (2) Members of the forest  
fire prevention and protection work group 23 shall be reimbursed for travel  
expenses under RCW 43.03.050 and 24 43.03.060. 25 (3) The work group must  
be staffed by senate committee services and 26 the office of program  
research.

27 NEW SECTION. **Sec. 3.** The wildfire prevention and protection work 28  
group shall report its findings and recommendations in the form of 29 draft  
legislation to the legislature by December 1, 2006.

30 NEW SECTION. **Sec. 4.** The sum of thirty-five thousand dollars, or 31 as  
much thereof as may be necessary, is appropriated for the fiscal 32 year  
ending June 30, 2007, from the general fund to the senate for the 33 travel  
expenses of the wildfire prevention and protection work group.

NEW SECTION. **Sec. 5.** This act expires July 1, 2007. --- **END** --SSB

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# Appendix I

## The Future in 2020

Many factors shape our understanding and preference for the future of the department's role in wildland fire<sup>1</sup> protection. These factors and the department's Mission and Values statements provide the context for the future. Core assumptions, based upon trends and forces now in play or likely to be in play in the near future in the world and in the state, permit us to envision a future for 2020.

In attempting to assess the future of wildland fire protection, we have tried to answer questions about the preferred future such as:

- “What will 2020 be like?”
- “What do we want forest protection to be like?”
- “What are appropriate roles for individuals, communities and institutions such as the fire districts, the department and other agencies?” and
- “What changes should be made?”

Answering such questions about the future requires a context. The context is set by some Givens and a larger number of Assumptions.

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### Givens

1. The core forest protection laws will exist in essentially their current form, including the existing limits on Department responsibilities relative to protecting improved property.
2. Citizens will expect that wildfires on private and state lands are effectively and efficiently suppressed.
3. The costs of wildfire suppression will continue to increase.

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<sup>1</sup> To help understand terminology, the following definitions will apply:

**Wildland Fire** - any vegetation fire that occurs in the wildland that may or may not involve structures;

**Wildfire** - an unplanned, unwanted wildland fire; and

**Prescribed Fire** - any wildland fire, planned or unplanned, used to meet specific objectives and is within an established prescription.

4. A healthy forest is resistant to uncharacteristic, economically or environmentally undesirable wildfire, windstorm, pests, disease and other damaging agents, and is able to recover following disturbance.<sup>2</sup>

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## Assumptions

### Land Use and Demographics in 2020

- Compared to 2000, the state's population will have increased by 1.7 million, a 28% increase.
  - About 80% of the increase (some 1.3 million) will occur in Western Washington (WWA).
- Washington's population will be increasingly concentrated in a few - primarily WWA - counties, resulting in a population with limited direct connection to land, resource production and wildfire awareness.
- By 2020, more than one in five Washingtonians will be 60+ years old, over a 40% increase, compared to 2005.
  - Increased demands for services, including emergency services, will create new pressures on local, state and federal budgets.
- Forest ownerships will be increasingly subdivided and otherwise fragmented.
- The amount of land dedicated or actively used as forests will continue to be reduced as forest land is converted to residential or other "higher and better" uses.
- New home construction will increase in the wildland urban interface and in the traditional forest zone.
- Fewer acres will be available for public use as changes in land use and concern for assorted liabilities lead landowners to close lands once available to the public.
  - Recreational use intensity on the remaining open lands will increase substantially.
  - Human-caused fires will increase in number and be a greater percentage than the current 85% of total fires on forest lands protected by the department.

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<sup>2</sup> From: WADNR. December 2004. "A Desirable Forest Health Program for Washington's Forests". Forest Healthy Strategy Work Group Report. See page 4.

## Societal Values in 2020

- The cultural shift to urban values will continue, even for some people living in rural settings.
  - Personal involvement, understanding and commitment to natural resource issues will continue to be low priorities for most people, but there will be strong emotional and other connections to the forest by a significant portion of the population.
  - There are substantial social and economic differences between the urban/suburban and rural landscapes.
- Societal acceptance of smoke from any source, including wildfire, will remain very low.
  - Restrictions on the use of planned or prescribed fire will increase.
  - Residential debris burning will decline.
- Water use, quality, quantity will increasingly be dominant issues.
  - Domestic water availability, both for communities and individual sources, will become critical in many locations.
- Awareness of forest health issues and linkages will increase.
  - Personal and community responsibility for protection of “their” resources in the forest may increase.
- The public will expect better management of wildfire costs, both at federal, state and local levels.
  - Performance measures will become increasingly important.
  - The public will continue to expect that economic values will be protected.
- There will be increased public policy recognition of both market and non-market values associated with wildfire risk reduction.
- Wildfire impacts on water, fish habitat and wildlife habitat will be acknowledged and quantified.

## State Forest Health Trends in 2020

- Deteriorating forest health will increase fuel loading and fire intensity.
  - The increase will be greatest on federal lands.
- Forest growth rates will continue to exceed timber harvests resulting in increased fuel loading and reduced forest health.
  - Over-crowded forests are more susceptible to insect and diseases, accelerating fuel build-up.
- Climate change will affect forest health.

## State Landscape Characteristics and Trends in 2020

- Climate change will likely increase the frequency and intensity of wildfires.
  - There will be continued wide fluctuations in the annual number of wildfires, with larger year-to-year variances.
- Wildfires will become larger and more complex due to homes and other improvements in the wildland environment.
  - Wildfires are more costly to suppress.
- Natural and human-caused disasters will continue to occur at the same or greater frequency.

## Firefighting Resources in 2020

- The number of qualified firefighters in DNR and federal land management agencies will be fewer due to retirements, reduction in force and other reasons.
  - Loss of institutional knowledge.
  - Long-term careers are increasingly uncommon.
  - The workforce is less willing to move.
  - Demands from the volunteer's "day job" will reduce flexibility and participation in the fire program.
- There will be fewer fire protection districts due to fire district consolidation.
  - Consolidated fire districts will have increased capabilities.
  - There is a net increase in the number of paid firefighters.
  - Non-fire responses (e.g., medical) by fire protection districts will be a larger proportion of total responses.
- Fire suppression contractors will be fewer in number but with expanded capabilities to provide qualified ICS overhead positions and other resources (e.g., engines, crews, tenders or aircraft). The net effect will be a substantial contracting force.
- Technological advances will improve the effectiveness of certain aspects of forest health, [PC7]wildfire prevention and suppression efforts.
- DNR roles will be different.
  - DNR will continue to coordinate key high cost resources [PC9]such as helicopters and aircraft.
  - Many other partners will have capabilities beyond those present today.
- There will be greater variability in the type and amount of fire protection services provided within the state.
- DNR will continue to be the lead agency providing wildland fire program and forest health technical assistance.

## **Interagency Cooperation**

- There will be a national “all risk” incident response capability.
- ICS will continue to provide an institutional structure for all types of incident response at the state and national levels.
- DNR will continue to participate in an interagency approach to wildland fire protection.
  - DNR will continue to adhere to a uniform national standard for training and qualifying incident management personnel.
- There will be more interstate cooperation among state firefighting entities.
- There will be a greater demand for “all risk” response.

## **Funding in 2020**

- There will be more competition for financial resources.
  - State and federal dollars will be increasingly scarce.
  - Federal support for state and private forestry programs will decline.
- The federal funding of fire suppression on federal lands will remain high but there will be fewer federal employees available to participate in ICS positions.







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# The Preferred Future in 2020

The previously identified Givens and Assumptions about 2020 have shaped our understandings and preferences. These are guided by the DNR's Mission and Value statements. Using this information, we answer the *questions about the future. This is the future that can be created through strategic action.*

■ **People in Washington understand and accept their role in personal and family safety, and community wildfire protection.**

■ People in Washington have knowledge about forest health conditions and understand the risks of forest fuels and wildfires.

■ People in Washington are motivated and take direct personal and community action to protect their property and their assets from wildfire.

■ **DNR's Resource Protection Program has clear purposes.**

■ DNR and the other resource protection providers have clearly identified roles in providing efficient and effective wildfire protection.

■ Partnerships are maintained and enhanced to provide efficient forest health, wildfire protection, wildfire prevention, and suppression services.

■ Partnerships with other organizations are increasingly important.

■ The resource protection program is based on stewardship, innovation, commitment and competence and is understood by the public.

■ **DNR proactively provides leadership and coordination for an integrated approach to resource protection in the forests and forested communities of Washington.**

■ Forest health is improved on all landscapes throughout the state due to individual, community and institutional actions.

■ Wildfire, insect and forest disease occurrence are at legally and socially acceptable levels.

■ **People in Washington widely recognize that forest health plays a critical role in both preventing wildfire and avoiding wildfire damage. The public has confidence that the most appropriate methods are being used to achieve and maintain forest health.**

- We focus resources and attention to reduce the risk resulting from forest fuel build-up.
- Fuel mitigation efforts are effectively prioritized and based on a landscape or community level to reduce the risk of loss of life, natural resources and improved property.
- Prescribed fire is safely used to improve forest health, thereby reducing risks to public safety by reducing the probability of significant wildfires and their potential human health risks due to large unregulated smoke emissions.
- People in Washington accept the appropriate use of prescribed fire and fuels reduction to improve forest health.
- Prescribed fire is managed to ensure that authorized burning does not violate air quality standards.
- Independent scientists confirm that DNR's forest health policies and procedures reduce economic and environmental risks, improving forest health.

■ **We use the most appropriate tools, technology and human resources to aggressively and safely prevent and suppress wildfires.**


- DNR's safety record for wildfire suppression is exemplary.
- We are strategic and efficient in acquiring and managing our fiscal resources.
  - ▶ DNR's fire-protection services are cost-effective and efficient.
- We effectively use technological and other resources to accomplish the mission.
- We have a diverse, sustainable and qualified workforce.
- Suppression tactics balance risk and environmental consequences.
- DNR's partnerships in wildfire prevention, wildfire preparedness and wildfire suppression enhance the efficiency and effectiveness of all participants.

■ **DNR's resource protection organization adapts to meet the broader needs of forest health, wildfire prevention and suppression.**

- The DNR is adequately staffed and provides training opportunities to ensure the long-term future of the intellectual capital necessary to manage the fire and forest health programs.

- ▶ DNR maintains an adequately trained and experienced work force to ensure the long-term, sustained internal capacity to effectively lead and manage the fire protection program.
- The DNR anticipates and leads change, understanding the demographic, economic and environmental forces of change.
- The delivery of resource protection integrates all three elements: forest health, wildfire prevention and suppression.
- The DNR recognizes that resource protection services should come from the most appropriate and effective sources, either public or private sector.
  - ▶ Resource protection service providers may be different in various geographical regions of the state.
  - ▶ Formal agreements are in place that define the roles of the various protection partners.
  - ▶ Trained individuals come from all parts of DNR; from local, state, and federal agencies; and from the private sector.
- **There is effective initial attack on all wildfires on state-protected lands.**
  - All property in Washington is protected by a qualified fire response organization.
    - ▶ The legislature has required state-wide fire protection services.
  - Initial attack is provided by the most effective and appropriate organization.
    - ▶ DNR provides initial attack on state-protected lands outside of fire protection district boundaries.
    - ▶ Fire protection districts with sufficient resources will take initial attack responsibilities for forestland wildfires within district boundaries.
    - ▶ Other fire protection districts with limited resources continue to team with the DNR in all forestland wildfire protection.





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# Appendix J

## Wildfire “types:” How the Department of Natural Resources responds to wildfires

During the December 1, 2005 Fire Strategic Plan Advisory Committee Meeting, Mark Kahley, Resource Protection Division Manager, gave an overview of how the DNR responds to wildfires. Included in the remarks was a discussion of how wildfire management changes with increasing complexity and risk. As requested, this summary is provided for the benefit of the Advisory Committee Members not in attendance at the first meeting.

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### The Basics

There are standard approaches that have been developed, based on decades of wildfire experience. Safety, effectiveness and efficiency starts with an understanding of fire behavior and type of resources, both people and equipment, necessary to control unwanted wildfire. Today, many wildfires are fought using resources from a variety of partners, whether they are state, local fire districts, contractors, federal or tribal.

To facilitate safe and effective interagency response among other wildland firefighting agencies, DNR subscribes to standard definitions and terminology. One set pertains to types of incident command organizations: DNR uses the five wildfire “command organization types” defined in Chapter 11 of *“Interagency Standards for Fire and Fire Aviation Operations 2004”*<sup>1</sup> (<http://www.fire.blm.gov/Standards/Redbk/Chapter11.pdf>).

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<sup>1</sup> *“Interagency Standards for Fire and Fire Aviation Operations 2004”*. Publication NFES 2724. Produced by the Interagency Standards for Fire and Fire Aviation Operations Task Group, National Interagency Fire Center, Boise, ID.

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## Complexity and Risk

The appropriate incident command organization can be thought of as a function of an incident's current and expected complexity and risk — Type 5 applies to the least complex incident and Type 1 applies to the most complex. For example, a small wildfire, like an untended campfire, is classified as a “Type 5” incident; these are usually controlled quickly with few resources and with little cost. In contrast, a large wildfire with many complicating factors might be classified as a “Type 1” incident; these often involve thousands of firefighters, elite incident management organizations, and expenses amounting to hundreds of thousands of dollars per day.

The DNR incident commander responsible for each wildfire determines the appropriate incident command organization on the basis of an analysis of that incident's complexity and risk. The incident commander orders the appropriate personnel and resources on that basis. At times, there are several changes in command organization between the times of detection and when the wildfire is finally is finally controlled.

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## Initial Attack - Type 5 and Type 4 Wildfires

DNR's fundamental wildfire suppression strategy is to achieve rapid, effective initial response (“initial attack”) of wildfires on DNR-protected lands, reasoning that doing so is safer; reduces adverse affects on natural resources and developed property; and is relatively inexpensive.

This is accomplished using a mixture of resources — some directly controlled by DNR and others from our partners such as other agencies and private contractors. When forest fires occur, the “closest force” concept is used as a guiding principle: DNR seeks response from the suppression resources that can most rapidly and effectively control a wildfire, regardless of who owns the suppression resource.

Initial attack is usually successful with Type 5 and Type 4 incidents; in these cases, the wildfire is brought under control with relatively few resources and within a single operational period. Historically, DNR has generally controlled 95% (or more) of all wildfires at less than 10 acres.

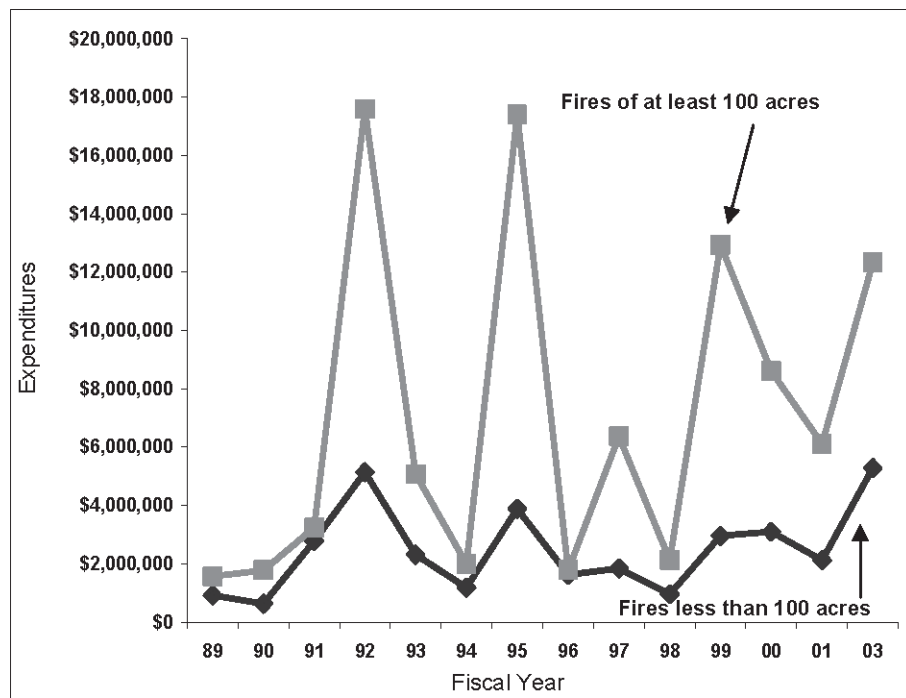
## Extended Attack (Type 3 Wildfires) and Large Incident Management (Type 2 and Type 1 Wildfires)

A small percentage of wildfires on DNR jurisdiction escape initial attack and grow to “Type 3,” “Type 2” or “Type 1” complexity levels. As a generality, incident complexity increases as wildfire size increases.

Such incidents typically extend over days or weeks, and are managed with increasingly more experienced and highly trained overhead personnel. In a typical year, only a handful of wildfires reach Type 2 or Type 1 complexity; however, these require large quantities of scarce suppression resources and account for a markedly disproportional fraction of DNR’s annual fire suppression expenditures. An “incident management team” (IMT) is usually assigned to manage these types of incidents.

The following exhibit<sup>2</sup> shows the financial significance of larger fires.

Exhibit 21 – Expenditures by the Number of Acres Burned



Source: JLARC analysis of DNR data.

<sup>2</sup> Exhibit 21 from “DNR Fire Suppression Study”, Report 05-11, by the Joint Legislative Audit and Review Committee. This chart identifies wildfire suppression costs on land protected by the DNR.

Fire size is often closely related to the previously described related Wildfire Types, with Type 1 and 2 wildfires almost always being larger than 100 acres. Very few Type 4 and 5 exceed 100 acres, except for those burning in grass and other “light” fuel types. Some Type 3 fires are over 100 acres.

<b>Table 1: Wildfire<sup>3</sup> Occurrence by Year on DNR Protected Acres</b>					
<b>Cal. Year</b>	<b>Total fires</b>	<b># &lt; 100 acres</b>	<b>% that is &lt; 100 acres</b>	<b># ≥ 100 acres</b>	<b>% that is ≥ 100 acres</b>
2004	866	859	99.19	7	0.81
2003	932	922	98.93	10	1.07
2002	902	889	98.56	13	1.44
2001	810	797	98.40	13	1.60
2000	781	771	98.72	10	1.28
1999	1003	993	99.00	10	1.00
1998	991	980	98.89	11	1.11
1997	657	680	98.94	7	1.06
1996	811	800	98.64	11	1.36
1995	886	882	99.55	4	0.45
<b>Average</b>	<b>864</b>	<b>857</b>	<b>98.88</b>	<b>9.6</b>	<b>1.12</b>

*While the wildfires greater than or equal to 100 acres are only about one percent of the total fires, they account for some three fourths of the suppression costs.*

## Management of Wildfires

Management strategies and suppression tactics for all types of incidents are determined by the incident management team. On a simple Type 5 or Type 4 wildfire, there may be only a few people on the team. There may be only one person who performs all of the functions that are provided by a number of people engaged in carrying out specific functional responsibilities on a larger, more complex incident. As complexity and risk increase, the management of the wildfire (or any incident) becomes more structured, requiring more people.

Central to the management any wildfire incident is a delegation of authority that defines what is to be done and who has authority to do it. This delegation is very simple for Type 5, 4 and 3 wildfires, usually taking the form of following established procedures set during standard training.

<sup>3</sup> Table 1 identifies only (classified) wildfires that occurred on DNR protected lands and do not include costs for suppression activities on lands protected by other entities or the costs of false alarms.



Type 2 and 1 incidents are different in that there is a written delegation of authority created uniquely for that particular incident. It defines strategic, tactical and financial objectives for the incident. These objectives are determined by the agency administrator (or administrators) with jurisdictional responsibility.<sup>4</sup>

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<sup>4</sup> For DNR, the Region Manager (or designee) functions as agency administrator for his or her Region.

